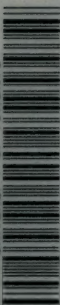


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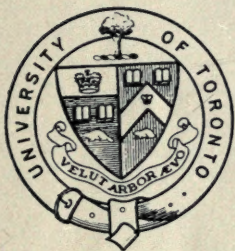
NEW ONION CULTURE

T. GREINER

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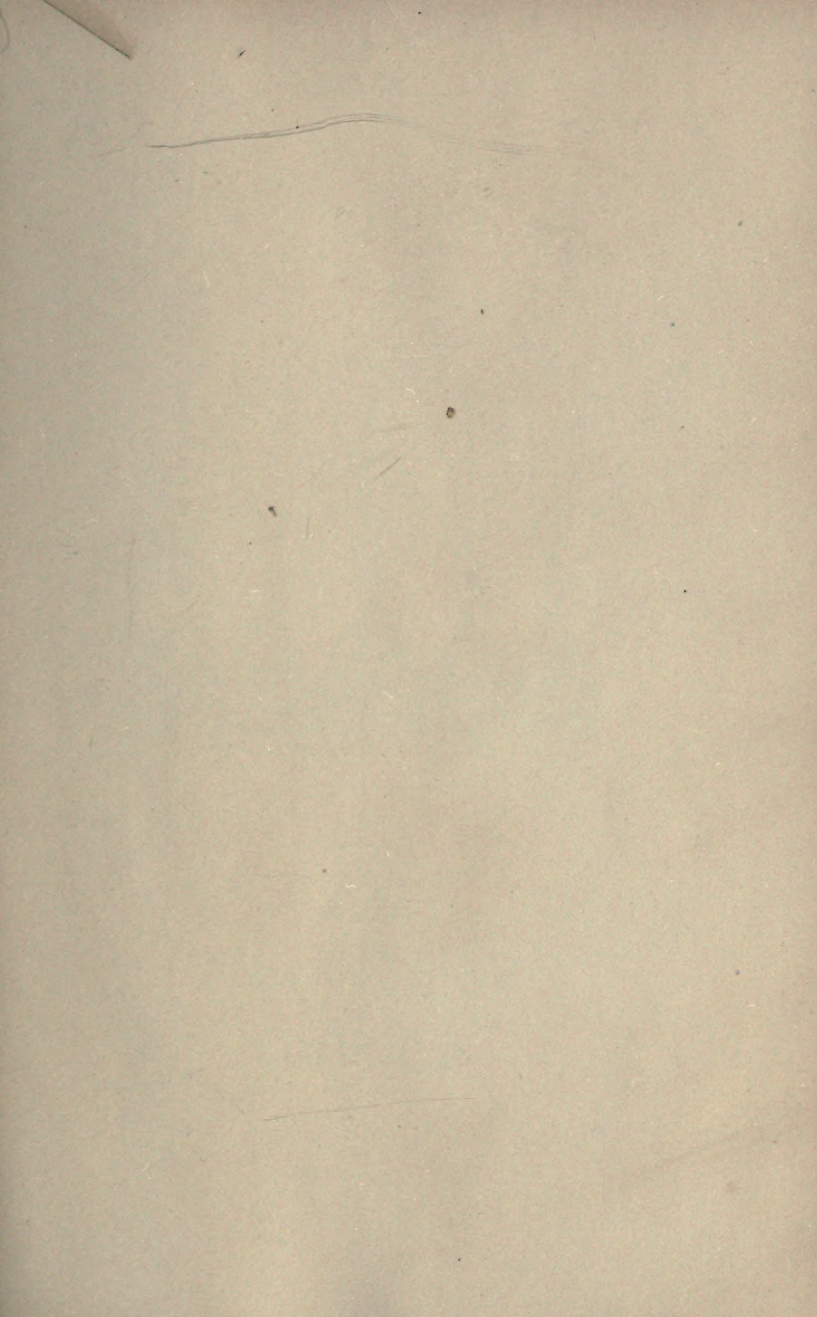
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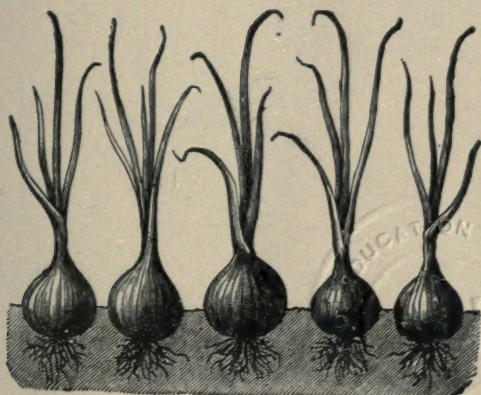
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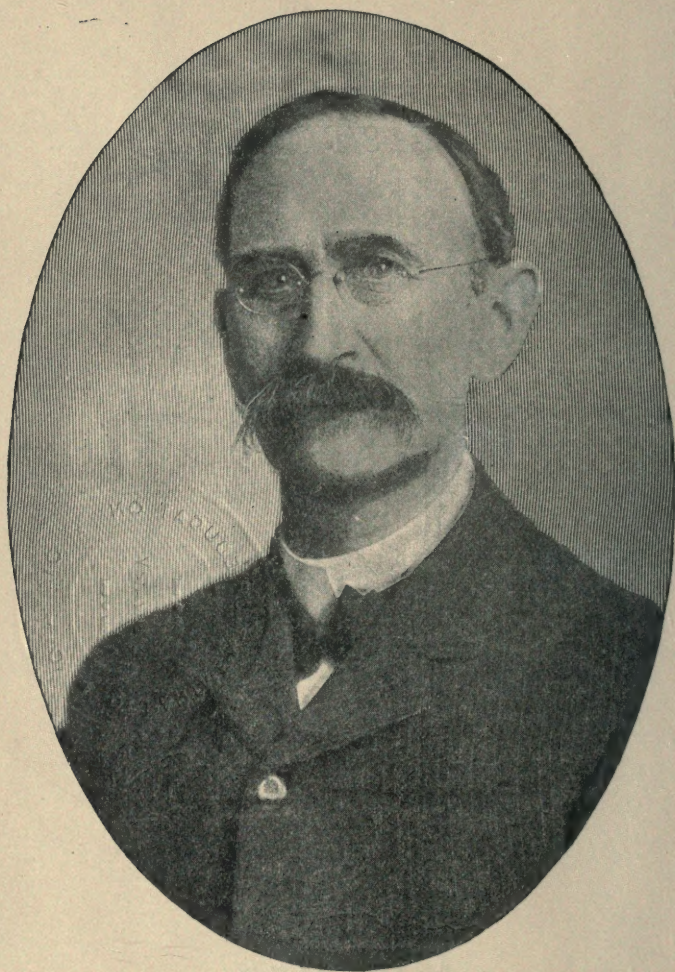
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THE STORY *of*



The
New Onion
Culture



Your friend
V. Greiner.

The New Onion Culture

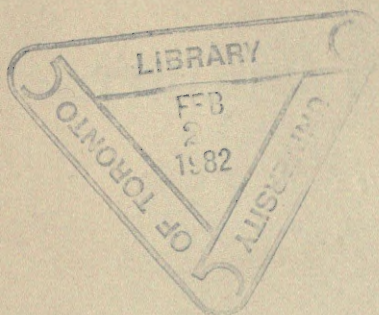
*A Complete Guide
In Growing Onions for Profit*



By T. GREINER
Rewritten and Greatly Enlarged

Illustrated

New York
ORANGE JUDD COMPANY
1911



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PRINTED IN U. S. A.

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PREFACE

In bringing this revised and enlarged treatise on the new way of growing onions by the method which has become famous under the name "new onion culture" before the public, the author makes no pretense of believing that there is a lack of literature on the subject of onion culture in America. On the contrary, he willingly and freely concedes that all phases of the culture of this vegetable have found a most liberal consideration at the hands of the writers of books, pamphlets, bulletins and agricultural newspaper articles. The author himself has been guilty of adding largely to the mass of printed matter on onions. All this, however, together with the large sales which most of the more popular treatises on onion growing have met with right along, only proves the great importance of the subject.

The first edition of *The New Onion Culture* was issued in the spring of 1891, and had to be followed by new editions in rapid succession to meet the unexpected demand; yet this demand still continues. No further excuse will therefore be offered for this attempt to take the subject in hand once more, and to bring the "new onion culture" into renewed and thoroughly up-to-date form.

Many hundreds of experiment station and department bulletins and reports on the onion have been issued, a list of which will be given later on. A veg-

etable that has commanded so much and so long continued intense attention, cannot be without great merit, nor without unusual promise as a profitable crop. True, the onion has often been looked upon as the pariah among vegetables. Yet the great majority of people are inordinately fond of onion flavor, even if some try to hide their liking for it as if they were ashamed of it. As a money crop, too, the despised onion occupies a front rank. Its annual production in the United States runs high up into the millions of bushels. The importations, especially of the large sweet or Spanish type of onions during spring and early summer, also represent a large figure, reaching sometimes close to the million-bushel mark for the year.

My own earlier interest in onion growing was revived by the introduction, in 1889, of the Prizetaker onion, a variety of that large and very mild Spanish type which we now import in still considerable quantities from abroad. The bulbs, in my (then) New Jersey sandy loam grew so beautiful and perfect, and of such large size (although grown by the old method, from seed sown in open ground in spring), that I became really enthusiastic about the possibilities hidden in the crop. In my further experiments with this novelty, I stumbled, in 1890, upon the method now generally known as "the new onion culture."

The new plan may now be safely said to have passed the experimental stage. It has stood the ordeal of a dozen years of trial, and sometimes of hostile criticism or prejudice. But it has slowly made its way into favor with those growers who understand its scope and purport, and has made money for them. Already in 1893 I quoted from a letter then just received from Mr A. I. Root of Medina, Ohio, the publisher of *Gleanings in Bee Culture*, and himself known as an enthusiastic gardener, as follows, viz:—

"In regard to new points in vegetable gardening during the past season, I believe what has been called 'the new onion culture' has made the most stir. At one of the farmers' institutes, I gave them a talk on the matter and exhibited some samples of large, fine Spanish onions. After I got through I felt a little afraid my talk had been pretty extravagant, and some of my hearers, I was told, criticised me a good deal. They said, 'Oh, yes, Root can talk, especially when he buys manure from the livery stables, and puts on more of it to the acre than an acre of our ground is worth; but what good does such talk do us?'

"You may perhaps surmise there were some among my hearers of the class that claim 'farming don't pay.' Well, a few days ago, a man I had seen a few times, came into the office and said he had something down stairs for me to look at. On the way down he asked if I remembered my talk in the winter. Then he said he had bought some seed, and had been at work trying the new onion culture. I felt afraid he had failed, and was going to blame me for my enthusiastic statements of what might be done on a single acre. By this time we reached the place where he had left his basket of onions. They were just beauties, and you ought to have seen his face while he held them up and told me how he did it. He hadn't any greenhouse nor hotbed, so he raised the plants in boxes in the kitchen window, and planted them out in ordinary clay soil such as farmers use for corn and potatoes. I asked him if he had found a market for them, and he replied:

"'Why, bless your heart, Mr Root, there isn't any trouble at all about the market. My neighbors right around me will take every last onion at one dollar per bushel, and I just wanted to see you, and tell that you wasn't extravagant a bit in telling what a farmer might do if he had only the will to do it.'

“Another man in the same neighborhood raised a wagon load in the same way, and brought them to Medina, and sold them at once for eighty cents per bushel at a time when ordinary onions were bringing thirty cents per bushel.”

I might tell a good many instances of a similar kind from my experiences during the past few years. It is generally found, that if the trial is made properly, and under circumstances not exactly unfavorable, the result will be such as to make anyone with a natural instinct for gardening, just as much of an enthusiast as the man in Mr Root's story.

After a full baker's dozen years of experience in growing onions by the new system, I am still in doubt whether to recommend it for general purposes of onion growing or not. Theoretically I see no objection to the substitution of the new for the old way even for the production of the crop of ordinary onion varieties for fall and winter use. The fact is to-day recognized by all authorities, and stands without dispute, that every one of our common onion sorts gives much larger individual bulbs when the seedlings are started early under glass than when seed is sown in open ground in spring, as is the practice of the old style. The crop is easily twice, possibly three and more times as large.

Farmers' Bulletin 39, issued by the United States department of agriculture in 1896, says: “Experiments have demonstrated that the transplanting system has many advantages, the most important of which is, perhaps, the increase in yield. This increase is due to several causes. The plants receive a good start under glass before they are set in the field, and thus have the full advantage of the cool spring weather, which is most favorable to rapid growth; when sown in the field, a month or more is consumed before the plants

are fairly started. This is a very important consideration in the South, where the hot, dry weather may arrive very soon. Transplanting, if properly performed, always secures a full stand, which is uncertain where the seed is sown in open ground. Pulling the plants results in more or less root pruning, and this doubtless exerts some beneficial influence on the yield.

"Experiments at many agricultural experiment stations show how material is the increased yield. At the Ohio station ten selected transplanted Prizetaker bulbs weighed eight pounds and four ounces; the same number of bulbs, not transplanted, four pounds and four ounces; Pompeii, transplanted, seven pounds and six ounces; not transplanted, four pounds and one ounce; White Victoria, transplanted, eight pounds and six ounces; not transplanted, three pounds and seven ounces; Yellow Danvers, transplanted, five pounds; not transplanted, two pounds and six ounces. Transplanting gave a decided increase with each of the fourteen varieties tried, amounting to one hundred per cent in some cases.

"At the Michigan station transplanted Prizetaker onions gave a yield of 548 bushels per acre, while bulbs not transplanted yielded only 216 bushels; Southport, transplanted, 296 bushels per acre; not transplanted, 172; Giant Rocca, transplanted, 556 bushels; not transplanted, 110. Experiments at the Rhode Island station gave a decided increase with Yellow Danvers, Red Wethersfield and White Portugal. Red Wethersfield onions transplanted at the Tennessee station yielded 823 bushels per acre, while those not transplanted produced at the rate of 206 bushels. North Dakota station reports experiments with several varieties, including Yellow Danvers, in which transplanted onions gave an increase from four to five times

as great as those not transplanted. This enormous increase in North Dakota is due to the abundance of rain during the early spring."

In practice, the large growers of fall and winter onions in the great onion growing sections of the New England states, New York, Ohio, Michigan, etc, have been reluctant to make the change in their methods. For myself, I will confess, that if I had an ideal onion soil, and were growing standard varieties for fall and winter market, the Yellow Danvers, Yellow or White Globes, etc, I am not even now prepared to say that I would not grow them by the old plan, and I am disposed to leave the choice between the old and the new to each individual grower according to his particular circumstances and surroundings, and possibly personal notions and preferences.

My own soil is not particularly suited to the ordinary onion crop. Try as I may, I am unable to grow a respectable crop of Yellow Danvers or Southport Globes, the leading varieties of that class, in the old way. The yield, 200 or 250 bushels per acre, is below the profit limit. For this reason I had to devise or adapt a system of my own to make onion growing profitable. I found it in the new onion culture.

Its chief purpose is to enable me to grow very large specimens, and a very large yield, of the very mild onions of the sweet Spanish type. Americans may not think much of the Spaniards, as a nation; but they like the mild flavor of their onions. Hundreds of thousands of bushels of onions are annually imported into the United States from Bermuda (the old crop during January), from Cuba (new crop during February), from France and Spain (during February, March, and up to midsummer). Various portions of our country have the right climate and soil to raise

just as good onions as any coming from foreign countries.

The retail customers of our grocery stores are asked to pay five, six or seven cents a pound for the imported "Spanish" onion. During summer, fall and part or all of the winter, the home-grown "Spanish," Gibraltar and Prizetaker, onions can be sold by grocers at a profit at three cents a pound, and allow one dollar a bushel for the grower. I can see no sense, on the part of the retail buyer, in paying the price asked for the imported article, or of importing the real Spanish onions and offering them for sale, while the home-grown "Spanish" onion, which is in every way the equal of the other, can be had. I would like to see the imported bulb crowded out of our markets, at least to some extent. It can be done by making use of "the new onion culture," and of the fine varieties of onions of the Spanish type which we now possess in the Prize-taker and Gibraltar.

The only problem which remains for us to solve is that of keeping the large sweet bulbs of this class until spring or early summer, whether this be done by means of putting in cold storage, or of exposing to the fumes of burning sulphur, or in other ways, at which times they would find ready sale at possibly twice the prices obtainable for them in the fall.

The new plan of onion growing can be justly and earnestly recommended for four special purposes, viz:

1. For the production of a full home supply of the very finest and largest onions; and, especially to the novice, as the very easiest way of securing most desirable results.

2. For growing exhibition onions that will be sure to take the prizes at any fair in competition with onions grown in the ordinary way.

3. For market gardeners who deal directly with retail customers and can work off a lot of really choice sweet onions in smaller quantities at high prices with their other crops.

4. As a means to interest your boy or boys in gardening operations and making them enthusiasts in the business.

Try the new onion culture on any of these lines. If you do your part only reasonably well, your highest success will be assured.

T. GREINER.

La Salle, N Y, 1903.

THE WHYS AND WHEREFORES

A SORT OF INTRODUCTION

"If I were a tailor, I'd made it my pride
The best of all tailors to be;
If I were a tinker, no tinker beside
Should mend a tin kettle like me."

Who has never met the "Jack-of-all-trades"—knowing a little of all, and being proficient in none—a clever sort of person, and handy to have around as a "general utility" man, but never rising above the level of mediocrity in anything, or able to aspire to great things, or to command large pay! The man who excels, even in a seemingly unimportant specialty, is the one who will achieve a brilliant success, and get big pay for his work.

Some of my readers undoubtedly have heard, or read, the old fable of the fox and the cat. The story, like other fables, has a moral, and is worth repeating. The two animals met in the woods, when the voices of hounds were heard in the distance.

"Poor pussy," said the fox, "what will you do when the dogs get after you?"

"I know a trick," replied the cat, "and am not alarmed."

The hounds, in the meantime, had come pretty close, and conversation was brought to a stop. The

fox sped through woods, and fields, and meadows, playing one trick after another, in the vain attempt to throw the hounds off the scent. The pursuers remained on his track, and finally overtook and grabbed him.

In his dying moments he looked up and saw the cat in the top of a tree, safe from harm. "Your one trick is worth more than my whole bagful," sighed he, and expired.

Many farmers are situated pretty much like the fox in the fable. They have a whole bagful of tricks by which they hope to escape the usurer and the sheriff. They raise a little wheat, and a little oats, a few potatoes, a little hops, some berries, a few hogs, or a cow, a horse, etc, things which often cost them one dollar and a quarter for every dollar they get for them. They try one trick after another, or two or three at a time, changing from one thing to another; and the harder they try, the harder they find themselves pressed, and at last—pity 'tis, 'tis true—in only too many cases they meet a fate somewhat like the fox's.

The whole bagful of ordinary tricks does not save them; but the one special cat's trick of climbing up to the top of the tree or ladder will never fail to give a way of escape. To rise above the heads of the crowd—that is the trick worth knowing. Learn the one trick well, and you'll be safe.

What I wish to do in this little work, is to tell of a genuine cat's trick which I have recently discovered—the trick of climbing up to the top in onion culture. To grow larger and better bulbs, and more bushels on a given area, than anybody else, has always been my aim as an onion grower. Yet it would be a rash move for me to defy the competition of growers anywhere who have learned and adopted my methods. This is a case

where the scholar may easily get bigger than his teacher.

The new trick or "secret" in onion growing eliminates almost every element of uncertainty from the whole business, and gives to even the novice such advantages that experienced growers, and may they live in the favored climate of California, would not stand the ghost of a chance in competition against him for the best crop, so long as they practice only the ordinary old method.

It's mere child's play for me, or anybody that follows my new plan, to grow twice as many onions on an acre as professional growers do under the old method, and to send bulbs to market over which the commission merchants, and the storekeepers, and consumers themselves, can grow enthusiastic; bulbs, too, which are readily selling for seventy-five cents a bushel, when ordinary onions bring fifty cents.

If I had been shrewd enough to keep the matter to myself, and work it for all it is worth, I might make a nice round sum of money by a discretion which, as usual, is the better part of valor. But it isn't my nature. I have to give the whole thing away, and teach my would-be competitors the ways in which they, if their soil conditions are more favorable than mine, can easily beat me. So I shall at least not be open to the charge of taking an unfair advantage over them. But, if I cannot be the best of all growers, I will at least try

* * * * *

The best of all *teachers* to be.

It may be of interest to some of the readers to learn the history of the new onion culture. It was in 1888 when a new variety of the large "Spanish" type of

onions was introduced under the name of "Prizetaker." At that time I had the advantage of the use of as fine onion land as the sun ever shone upon, a fairly fertile soil in Monmouth county, New Jersey. I always made it a practice to test all promising novelties. The Prizetaker onion was one of them. It was one of the comparatively few novelties which have lasting value. It was above all others the one which made the testing of novelties so profitable. I could better have afforded to pay \$500 or even \$1000 for this test of the Prizetaker onion, than miss the chance to invent "the new onion culture." This is mentioned, to prove, *en passant*, the practical value of novelty tests in general. In short, even the first test of the Prizetaker onion, although grown in the old way, by sowing seed in open ground in early spring, resulted eminently satisfactorily. In the fall of that year I had the prettiest, most perfect onions, of reasonably large size, imaginable, and I became so enthusiastic over this novelty, that I then described the new variety in agricultural papers as "the king of all onions."

Even the next year, in 1889, seed could only be obtained in very small quantities, and this at high prices. In order to make every seed count, and knowing how easily onions can be transplanted, I sowed the seed in hotbed in March, and transplanted to open ground early in May.

The results were again so gratifying, the bulbs so large and attractive, and their quality so much admired by all who had a chance to test them, that acquaintances and neighbors were infected with my enthusiasm about the new onion and the new way of growing it. Among them was a lad of fifteen or sixteen summers, with the same yearning for pocket money which we expect to be the natural inheritance of all other boys. The apparent ease with which these large and salable bulbs

were produced, appealed with tempting and irresistible force to the lad's mind. Finally he came to me with a proposition. He must try to grow a larger patch for himself.

There is no surer way to interest a boy in a certain task, and start him in the right way and in the habit of doing good work, than by letting him know he is to receive a share, or possibly the whole of the proceeds from his own efforts. There is nothing that will discourage a boy more quickly than lack of good faith on the parent's side. Don't make it the boy's calf and the father's cow.

A prominent seedsman that spring offered a prize of \$50 for the best crop grown from one ounce of Prizetaker seed. That was an extra inducement, so the lad got the ounce of seed and sowed it in coldframe early in April, transplanted the seedlings to open ground in May, and raised a crop amounting to a plump ton of nice onions which might have taken the prize for largest yield but for the competition by growers in California. As it was, the chief purpose was accomplished, namely to put a good lot of pocket money into the lad's possession. It is safe to promise similar results to any boy for similar efforts.

The experience of these three seasons had now firmly and permanently established the practice of growing the onions of the Spanish type by the new or transplanting method. It now only remained to improve and systematize this new way, and to bring it before the public for more or less general adoption. The first edition of *The New Onion Culture* came out in the spring of 1891, and made considerable stir among American gardeners. Ever since that time my efforts for the further improvement and simplification of the new method have been continued, apparently with good success. The pages of the little book now

before the reader, which is an entirely new work, give evidence of the progress that has been made, and contain all the information about the new plan now available.

I claim some credit for the discovery of this novel method. Still I admit I am not the first person who transplants onions. On a small scale, specimens have been grown in England in a similar way for exhibition; various growers have for generations employed the transplanting process for filling out gaps in their onion rows; and others have practiced a plan almost identical with mine in growing early onions for bunching. But to apply the principle to field culture, to reduce the crude plan to a system, and to practice, advocate and teach it in advance of all others—that, I claim, is my merit.

Professor W. J. Green, of the Ohio experiment station, has worked out this same problem, simultaneously with me, but entirely independently. Neither of us knew that the other was following the same track. The first, though brief, description of the novel method appeared in *How to Make the Garden Pay*, written by me in autumn, 1889, and published at the beginning of 1890. Professor Green, soon after, gave his version of the new onion culture in a bulletin issued by the Ohio experiment station, and since then the new method has been the subject of innumerable newspaper articles, notices in bulletins and in agricultural books.

In my attempts to reach a maximum crop, I have often met difficulties which many other growers will not have to face. For a long time the privilege of selecting ideal conditions of soil and locality for my operations had been withheld from me, and I have had to make the best of circumstances and surroundings in which I happened to be placed by accident or

otherwise. Yet adverse circumstances have not been able to discourage me, and there is no need of anybody giving up in despair merely because the conditions at his disposal are not the most favorable. By discreet management, one can do pretty well even if things do not happen to be just as one would like to have them.

It is perfectly feasible, perfectly practicable, to grow onions by this new plan even on rented land. Yet I believe I would rather live in a hut, surrounded by a few acres of land, all my own, and be able to say, "*J'y suis, j'y reste*" (here I am and here I stay) than live in a rented palace. No matter how poor or defective the land, by a little effort here and there, and by little additions now and then, the land can be brought up to the highest state of fertility and cultivation in a few years, and the humble house can gradually be transformed into an earthly paradise, and all this without much actual expense, or conscious effort. This course surely will prove more gratifying than to operate on rented land, to make improvements from year to year, and after a short period of occupancy turn the whole over to somebody else, and let others enjoy the benefits from the former occupants' labors and painstaking. But in whatever situation in this respect you may find yourself, do as I always have tried to do, namely, *make the most of your opportunities*.

Have I any doubt that Prizetaker and Gibraltar onions may be grown in this way by one, two, three or four acres with a profit? No, not the least. But this book is not written for the purpose of getting the reader wild on the subject, and into trouble. It is written primarily for the purpose of inducing you to make some careful trials of the new onion culture, operating at first on a small fraction of an acre of carefully selected land, to enable you to learn not only how to grow the onions, but also how to exchange them for

cash after they are grown. Then my responsibility ceases. If you then conclude to grow these onions by the acre or acres, you do it at your own risk and presumably with full knowledge of what you are doing.

I had still another object in view in writing this onion story. What was done by the lad already mentioned, in this case, can be done by any wide-awake youngster of ordinary intelligence. The new onion culture points out or opens an easy way to him of earning a little pocket money of his own, and of growing a crop of which he may be proud, and which will take the prize at horticultural fairs, securing a little additional reward, notwithstanding the competition of the old experienced onion grower who works only on the old plan.

And what a chance for horticultural schooling and training this affords besides! Can there be a better opportunity for awakening your boy's interest in horticultural matters and making him study up horticultural problems for himself, than by putting a copy of this book, and an ounce or two of Prizetaker or Gibraltar onion seed into his hands, and a few square rods of good land at his disposal for a start, and then tell him:

"Go ahead and see what you can do."

THE NEW ONION CULTURE

CHAPTER I

Well Begun—Half Done

HOW THE PLANTS ARE GROWN

Our aim always is and must be for a prize crop—for specimens so large and fine that we can expect the first prize at any fair, and are sure of top prices in any market. In this an early start is the chief condition of full success. Without it the undertaking is not *well begun*; with it, it is really more than half done. This includes all reasonable care in procuring the needed supply of seed in good time. We try to begin sowing seed just as soon after January first as we can get a spot for it in the greenhouse or a hotbed. I usually have the best success from plants started along in January or not later than early in February. Yet I have grown fine crops from seed sown as late as first week in April. It depends somewhat on the season, but the earlier sowings ordinarily will give the best crops.

Some of my onion growing friends grow their own Prizetaker onion seed, which is not a particularly difficult matter, and insures the possession of the seed whenever they wish to sow it. I frequently have found difficulty in securing seed, especially of the

Gibraltar onion, early enough for sowing in the greenhouse when I most desired to sow, namely in January. Sound, medium-sized Prizetakers are easily kept over winter, and may be planted out about September first or next spring, in furrows six inches deep and five or six inches apart, in soil of medium fertility for seed production. When most of the seeds in a head are ripe, the head is cut off and put away in a dry and airy spot, to dry, and the seed then thrashed out and properly cleaned.



Fig 3—YELLOW PRIZETAKER ONION

When we depend on the seedsman for our supply, however, the order must be given in good season so that the seeds will be on hand when needed. Only two varieties come in consideration with me, the Yellow Prizetaker (Fig 3) and the Gibraltar onions. At present there is little demand for red onions of any kind, and for the pink (or red) Prizetaker no more than for Wethersfield or Red Globe. The yellow sorts are the

ones that are wanted. For experiment you may plant any other sort or sorts that you care about.

In a small way, plants may be raised in boxes (so-called flats) placed in a kitchen window. A flat ten by eighteen inches will give plants enough for a full family supply of fine onions. Such a box should be about four inches deep, and be filled with very rich, clean soil, or with rich compost covered about an inch deep with clean sand. Plants raised in flat, ready for transplanting, are seen in Fig 4.

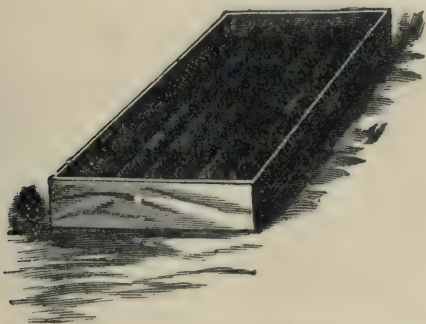


Fig 4—PLANTS READY FOR TRANSPLANTING

The great majority of gardeners have no greenhouse facilities. They must make use of hotbeds. For operations during February or March, at least in a northern climate, cold frames will not answer; nor will muslin covering. Common hotbed sash is the necessary thing to cover hotbeds at this time.

There are two ways of constructing a hotbed; one by digging a pit and filling this with a two-foot layer of fresh and fermenting horse manure, as shown in Fig 5; another by piling this manure layer directly upon the ground, a frame corresponding with the size and desired number of hotbed sashes to be placed in

either case upon the manure, and then filled with prepared "hotbed" soil, as shown in Fig 6.

It is only for a southern location, or for very late planting at the North, that an ordinary cold frame may be made to answer. This is a simple box of boards or planks, slanting from the rear, where it is about twelve inches high, to front, where it is only six to eight inches high. This box is set directly upon the ground in some well-drained and well-protected sunny spot, facing south or southeast. It is then filled with

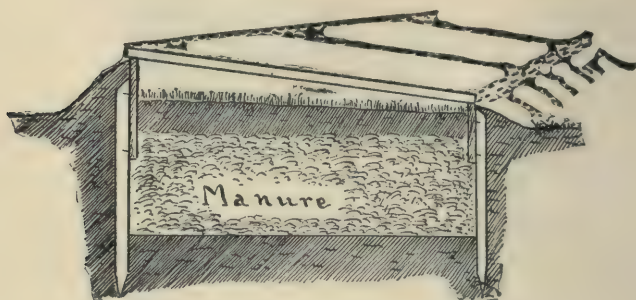


Fig 5—HOTBED IN SUNKEN PIT

a mixture of good turfy loam, sand, and a little fine old compost to about four inches from the top. Ordinary rich garden soil, freed from stones and rubbish by sifting, and further enriched with fine old compost, well mixed and sifted together, will also answer every purpose. The surface is made fine and smooth with a steel rake, and marked off with straight furrows from front to rear. They are easily drawn across with the handle of the rake, or with a little stick, or even the finger, and should be about an inch deep, and about one and a half inches apart, or as close as they can be made conveniently.

I sow about one and a half ounces of seed on the space covered by a single sash frame, which is usually three feet by six or nearly that, and expect from it from 5000 to 8000 plants. To grow the 120,000 plants required for a one-acre patch would therefore call for the use of a frame of not less than nearly twenty sashes.

The seed is to be evenly scattered into the furrows, and the latter carefully filled in again with the hand. The soil is then well firmed by pressing a piece of board or block of wood down upon it. The sash or sashes are then put on, and the bed left pretty much



Fig 6—HOTBED ON LEVEL GROUND

to itself, except giving air on fine days, and an occasional thorough watering when the soil seems to become very dry. In eight weeks, more or less, the plants will be ready for transfer to open ground.

Personally, I am getting to be more and more in favor of greenhouses for growing plants of any kind, and of onion plants in particular. We have to start onion plants early—earlier, really, than it is convenient to make and operate hotbeds, unless the latter are heated by an ordinary flue, or, still better, by the waste steam of factories.

A so-called fire hotbed (one heated by a flue) is a rather simple affair, and easily and cheaply put up

when you have the needed sashes at command. Select a well-drained and well-protected spot for the bed. If possible, it should slightly slope to north or south. Dig a pit at lowest end for a simple furnace, and with a few firebrick, some grate bars, and an iron door, build a fireplace. The flue should run under the center of the bed, ending in a chimney at the upper end. The hotbed itself is a simple frame, with a scantling as a ridgepole, say two feet above the ground, and a line of ten or twelve-inch plank on each side. The two rows of sashes, resting on light rafters, and meeting over the ridgepole, form a kind of a gable roof over the bed.

This arrangement, of course, is simply a modified hotbed. The operator has to get at his work in open air, by raising or removing sashes, as in ordinary hotbeds. Still he has this advantage, that he can control the bottom heat. Whenever he gets ready, and no matter how hard the ground may be frozen, he can start up his fire, and soon get the bed in shape for planting. If you have an opportunity to use waste steam, you should consider yourself especially fortunate. You may be able to conduct it into lines of two-inch tiles laid right under the frames, and thus secure a reliable and controllable medium of heating your plant beds at smallest expense. It is a chance too good to be neglected.

But there is nothing to hinder you from utilizing this same waste steam in greenhouse heating; and if you have the sashes anyway, you can put one up quite cheaply. In the absence of waste steam, a simple flue might be made to answer. The illustration will give you an idea of the construction of building. Put up a simple frame, three-quarters span, and board up at the sides and back. Better have these walls double, and well lined with paper, or the space filled with dry

sawdust. Three rows of ordinary hotbed sashes form the roof. The flue is situated as shown in Fig. 7, and heated from a fireplace constructed as described for the fire hotbed. There is no need of going further into the details. I will only call attention to some of the advantages of this plan.

In the first place, there is next to no money outlay required for it. The few boards and scantling needed for the frame can be found on almost any place, or can be had for little money. Anybody of ordinary intelligence and mechanical skill can put up the frame.

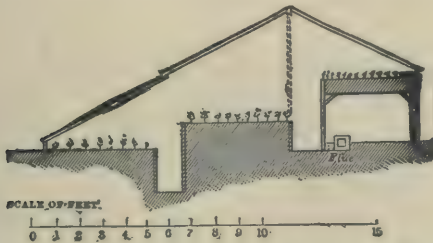


Fig 7—FORCING PIT, COVERED WITH HOTBED SASHES

A few of the sashes can be hinged, to serve for ventilation. You can do all the work of running this half-and-half arrangement under shelter and with comfort. The flue being on one side gives a chance to raise all the different vegetable plants. The high bed furthest back, over the flue, will be the warmest. Here you can start tomato, pepper and egg plants, etc, or use it for forcing cucumbers, tomatoes, etc. The next bed, in the center, which is somewhat cooler, may be used for tomato, pepper, early cabbage and similar plants after they are well started, also for forcing lettuce, radishes, etc. The bed on the ground level is the coolest and just right for growing onion plants.

A building of this kind is much better and handier—and cheaper in the end, because more satisfactory and more prolific of results—than ordinary hotbeds. If you are not afraid to invest an extra one hundred dollars or so, better put in a hot water heater, with the necessary pipes. The house will be managed with one-half the labor, and double the satisfaction.

A neat little greenhouse well suited to the needs of the small grower and amateur, is shown in Figs 8 and 9. It is a double-span house, a little more costly than the other, but extremely convenient, and fit for raising

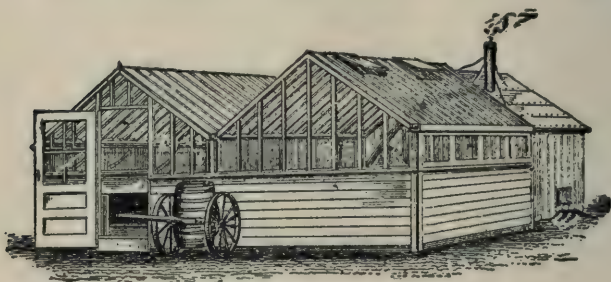


Fig 8—SMALL GREENHOUSE—ELEVATION

any kind of vegetable or flower plants, or forcing any kind of ordinary vegetable. The pit for the heater is dug at the north end of one of the spans. If I build another, however, I should have only one span of double the length.

Many other styles of greenhouses might be mentioned. Some growers who have a lot of hotbed sash available for the purpose will wish to put up a cheap structure and utilize their stock of sashes for the roof. A house of this kind does not cost much, and with a little ingenuity and good management may be made to answer any purpose of an onion plant nursery. It should be remembered that onion plants are quite

hardy. They are not injured by a light frost, nor by extremes of temperature or sudden changes, nor by a direct transfer from greenhouse to open air conditions without previous hardening off. It is true, however, that we can force more rapid growth at a comparatively high temperature, ranging say between sixty and ninety or more degrees Fahrenheit, than in a much lower one.

One of my friends, near a neighboring city, who has grown several acres of Prizetakers on the new plan yearly for several years, has taken another course to secure his hundreds of thousands of plants. In his vicinity lives a party who makes a business of growing

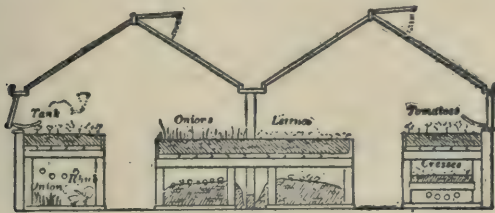


Fig 9—SMALL GREENHOUSE—CROSS SECTION

annually a million or two of tomato plants under contract for some large canning houses which supply the plants to their tomato growers. Some of the greenhouses in which these plants are grown usually stand empty until nearly the time that onions can be taken off the benches and set in open ground. A crop of onion plants may here be produced just as well as not, and with but slight additional expense. So my friend contracts for his plants with these tomato plant growers with profit to both parties in the transaction.

In my own little greenhouse I have for many years done exactly as these professional plant growers do, namely, have grown my onion plants during the win-

ter; and when the benches were cleared from them in April, filled the vacant spaces up with tomato, egg and pepper plants just as fast as there was a chance. Thus I make the best use of my available bench room.

Often there is considerable call for Prizetaker onion plants in early spring, and even up to June. The price usually asked for them ranges from fifty cents to one dollar per thousand plants, and I am sure that they can be grown at that figure at a good profit where greenhouses are available, and possibly stand idle anywhere during a part of that time.

In growing onion seedlings under glass I have had to fight only one single enemy—and that is the damping-off fungus. I have at times lost a considerable portion of my plants from this cause. The stem appears to dwindle away near, usually just below, the surface of the ground, and the top falls over and dries away. The infection undoubtedly comes from the soil. If we use new soil, or any soil that is free from the fungus, the plants will remain healthy. Watering the soil freely with a solution of copper sulphate, a pound to two hundred gallons of water, has seemed to prevent the loss of plants from this cause. An excessively high temperature and a close, moist atmosphere should be avoided, and the surface of the bed should never be allowed to become dust dry. To provide for possible loss caused by the disease, however, I practice and advise sowing seed rather thickly as already stated (not less than one and one-half ounces to the space covered by an ordinary hotbed sash). It is better to be compelled to thin plants where too thick, than to have large vacant spots in the bed.

It is possible, however, to prepare the seed bed in such a manner that the fungus is entirely kept out. For instance, I have used clear, sharp sand brought fresh from the bank of the river, sowed the seed in

this, and then fed the plants entirely on liquid manure. I have a cistern under one corner of the barn. The rain water washes a good deal of pigeon manure off the roof into this cistern. Then I add chemical fertilizers, especially acid phosphate, muriate of potash and a little nitrate of soda or potash, and find that by



Fig 10—A WELL-PREPARED SEED BED

watering the onion beds copiously with this liquid, I can force a very rapid growth in my seedlings.

Another safe plan is to fill the seed bed, bench, frame or box pretty well up with good old compost, or very rich soil well pressed down, and on top of this to place a layer, an inch or inch and a half deep, of clear, sharp river sand. The seed is sown into this sand. The roots of the seedlings will soon get down

into the rich feeding grounds under the sand, and produce a wonderfully thrifty and healthy growth, as seen in Fig 10.

A further advantage of this method is that but few weeds come up among the onion plants. If weeds appear, pull them up by hand. Where plants stand overcrowded in the rows, thin, even severely, where needed. The bed will require frequent and copious watering. When the plants are making good growth, during latter part of February and especially in the sunshiny days of March, I give my onion seedlings their regular daily soaking.

When standing as thickly in the beds as I want them they are also sure to get top-heavy and will need repeated and severe clipping. I usually cut them back with a pair of common sheep shears, removing each time nearly the full upper half (in length) of the plant. Our aim is to get seedlings the bulb of which, just above the roots, is between one-eighth and three-sixteenths of an inch in diameter (if of nearly pencil thickness, all the better), and this by the time that the open ground is ready to receive them.

CHAPTER II

As You Make Your Bed, So You'll Lie

WHAT SOIL TO SELECT, HOW TO MANURE AND PREPARE IT

"What spot would you advise me to select for my onion patch?"

The inquirer had told me that he had a piece of good loam, not excessively fertile, 'tis true, but having been cropped with carrots and beets the year before, consequently quite clean, and in fair tilth, and of course, well underdrained.

"That is the exact spot you want," said I.

"Why not plant it on that deep, rich muck?" came the next query.

"It is decidedly too loose and moist. The fine Gibaltars and Prizetakers might all take a notion to grow up thick-necked—romps, scallions, and worthless for sale or keep. By all means take loam, sandy preferred, and if possible with good natural drainage, but certainly not without thorough drainage of some kind. Water should never stand on the surface of an onion patch even for a single day."

On the whole, however, I do not object to well-drained, deep, rich muck. I myself have grown excellent crops, in the old way, on such soil, and once I went through a several-acre patch in Mt Morris, N Y—soil being muck with a little sand mixed in, and the land arranged for sub-irrigation—which had an enormous crop of Yellow Danvers upon it, undoubtedly more than 1000 bushels per acre. It will

be hard to find better onion soil than a well-drained, well-subdued sandy muck.

With good plants, and an early start, I would not hesitate to set Prizetakers or Gibraltars on such well-drained muck land. Small, poorly-grown plants, set late in the season on moist muck soil that is excessively rich in nitrogen and less abundantly supplied with mineral plant foods, are liable, especially in a wet season, to give you thick-necked, worthless onions, and plants rather than bulbs. Sand and sandy loam, however, favor this undesirable development much less than other soils.



Fig II—A PERFECT CROP OF GIBALTAR ONIONS

I wish to call especial attention to this fact, that wherever plants of nearly pencil thickness were set reasonably early in the season, the onions were large, uniform and fine, without break in the row, and the yield at a high acre rate. One of the finest crops of perfect bulbs—of Gibraltars, Yellow and Pink Prizetakers—that I ever grew, I secured last year on a clay loam of only fair fertility, but having good drainage. The season was excessively wet, especially in its earlier part, and reports received by me showed that many patches of onions of this type, all over the country, produced little else but scallions. My patch had received only a light dressing of old stable manure, but a good dose of muriate of potash and acid phosphate,

at the rate of several hundred pounds each per acre, applied broadcast just before the last harrowing. Such an application seems always safe, in fact safer than the use of excessive quantities of organic and nitrogenous manures, except on sandy soils.

Stimulated by the continuous and excessive rainfall of the earlier part of the season, the onion plants showed some tendency to produce thick necks, and a continuation of these abnormal conditions might have spoiled the patch. But the rains finally ceased, recurring only at reasonable intervals and just sufficiently

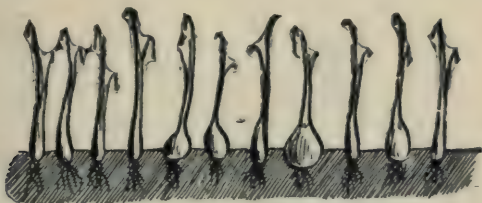


Fig 12—ROW OF SCALLIONS

to provide a fair supply of moisture for healthy growth. The outcome was a crop of onions which as an average appeared as seen in Fig 11 in comparison with scallions, Fig 12, the single specimens weighing from three-fourths to one and one-half pounds apiece.

The soil must be free from stones and coarse gravel, and rubbish of any kind, and as near as possible, also, from weed seeds. A new clover sod that will pulverize nicely will do first rate; but if the sod is old and tough, it would hardly be suitable for our purpose shortly after being broken. A crop of potatoes, corn, beets, carrots, cabbages, etc, will get such a sod land in admirable shape for a succeeding crop of onions.

Whatever the soil, and in whatever condition, the leavings of the preceding crop, coarse weed stalks, etc, should be removed with great care before the plow is struck in. All such rubbish interferes in a very inconvenient manner with after-cultivation, and any neglect in the proper preparation of the soil will be greatly regretted later in the season.

This disposes of the problem what soil to select for the onion crop. Now what about manure? Some suggestions have already been given. I have usually recommended greatest liberality in the use of all sorts of manurial substances.

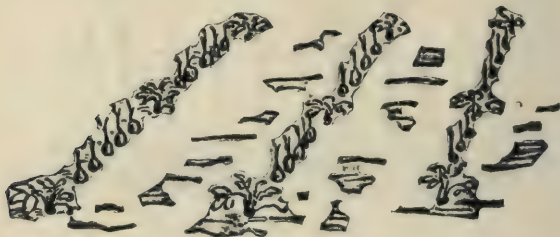


Fig 13—ONIONS IN THE NEW STRAWBERRY BED

“Put it on thick” is still my advice when we have plenty of any kind of good compost that is reasonably free from weed seeds, and the soil is of a rather sandy nature. But if the latter is strong loam and very rich already, or a loose rich muck, I feel that light dressings of organic manures will do well enough, and may be safer, the larger proportion of the plant foods to be given in the form of standard chemicals, especially plain superphosphate (such as dissolved South Carolina rock) and muriate of potash, up to 500 pounds per acre of the former and 200 or 250 pounds of the latter, and an occasional light dressing, say 100 pounds, of nitrate of soda if the plants seem to need it, that is,

if they fail to make a thrifty succulent growth. These applications of chemical manures, especially phosphate and potash, I believe are always safe and will seldom fail to show good results. Yet I do not wish to be understood as asserting that good onion crops cannot be grown without them. I have seen and grown excellent crops of fine solid bulbs on good soil manured only with common barnyard or stockyard manure.

All sorts of domestic manures come acceptable for onion growing—horse manure, cow manure, hog

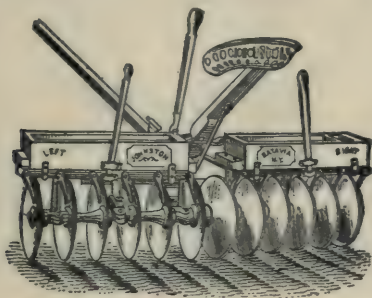


Fig 14—DISK HARROW OR PULVERIZER

manure, sheep manure, poultry manure—or all sorts of mixtures and composts, the finer the better. Poultry manure is most excellent for onions, and there is no need of being afraid of it. My way of managing it is to scatter some dry soil, muck or sifted coal ashes under the perches from time to time. Thus I obtain a fine, dry, rich compost, and I would not hesitate to put this inch-deep all over the ground if I could only get enough of it for such a dressing. It brings the onions every time. I usually apply it after the ground is plowed in spring, mixing it with the surface soil by thorough harrowing.

Besides these manures I would use everything else

I could get hold of in the shape of fertilizing materials, such as wood ashes, leached and unleached, etc; but I should not use raw manure, and none not reasonably free from weed seeds, as I have already stated.

For house use, and especially to secure a supply of fine bulbs for the table during midsummer, I have sometimes planted a lot of onion seedlings in the new strawberry patch, in the manner illustrated in Fig 13.

I usually plant my strawberries rather farther apart than most people. I lay off the rows four feet apart, and set the plants three feet apart, and for such

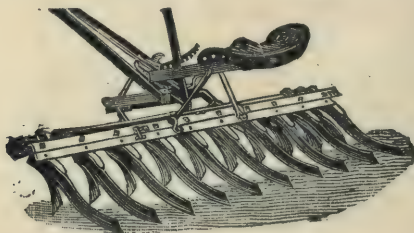


Fig 15—ACME HARROW

inveterate plant-makers at Michel's Early perhaps even four feet apart in the rows. This leaves plenty of vacant space between the plants, which may be utilized to good advantage by setting half a dozen or a dozen of onion plants between each two strawberry plants in the row. Of course these onion plants are pulled up early, sometimes even for green onions, and in most cases before the tops have entirely died down, so as to make room for the strawberry runners, which in the latter part of the season try to occupy the entire space in the rows. But I have grown as large and solid onions in this manner, and this without extra fussing and with less painstaking than in the regular onion patch.

HOW TO FIT THE LAND FOR THE ONION CROP

If at all practicable, I invariably try to plow the land deeply and thoroughly during the fall previous, leaving it in the rough and exposed to the benevolent action of the weather, especially repeated freezing and thawing. Fine manure in the desired quantity may be applied any time during the winter or early spring directly upon the plowed surface, or upon the snow covering it.

While spring plowing may not be required on mucky or loose loamy soils, I would not omit it if the soil is packed hard by winter rains and snows, or if

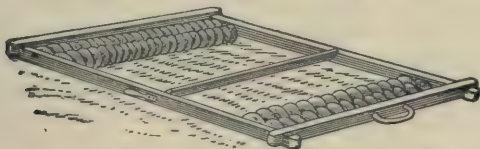


Fig 16—MEEKER SMOOTHING HARROW

the manure applied is in the least coarse. Manure that will not work up perfectly fine, and mixed with the soil will not make a perfect seed bed, should be plowed under.

On our own soils we have to use the disk harrow or pulverizer (Fig 14) in order to get the land in best condition. This cuts deep and works the ground over very thoroughly. I prefer to use this first, then follow with the Acme (Fig 15), which smooths the surface that the disk has left somewhat ridged. In the absence of an Acme, a common smoothing harrow or drag will do very well. Should neither disk nor Acme be at command, I would use a narrow-bladed cultivator, such as the Planet Jr or Iron Age horse hoe, or a spike-tooth cultivator, stirring up the whole

surface, and thus mixing the compost with the soil in a thorough manner.

The rich, fine sandy loams, or soils which, like sandy muck, contain a large amount of organic matter or humus, will not usually need so much manipulation. The free use of an ordinary "drag" or smoothing harrow after plowing will be all that is required to get the surface reasonably smooth and fine. Chemical manures, if to be used, may now be applied broadcast or with a drill. Nitrate of soda only is to be withheld for a while and for application later on.

To put the finishing touches on the land, I invariably use the Meeker smoothing harrow (Fig 16). In fact, I would hardly know how to get along without it. This makes the surface about as even as could be done by hand raking, and in one-tenth or one-twentieth the work or time required for the latter operation. The Meeker harrow costs twenty dollars or more, but it is a great labor saver, and almost indispensable in the market or farm garden. The ordinary steel rake, however, is good enough for smaller patches. Whatever tools you use, the surface should be as smooth as a board, and the land is then ready for planting.

CHAPTER III

A Difficulty Easily Overcome

HOW THE PLANTS ARE SET IN THE GROUND

To transplant a few hundred onion plants is not a formidable task, but when you set 120,000, covering an acre, you have a big job on hand, and no mistake. Indeed it is *the* work connected with my new onion culture; all the rest of it is easy—mere child's play, I might say.

It takes about 120,000 plants to set an acre of onions. I can get boys, that, with some practice, will set 2000 to 3000 plants a day, and nimble-fingered persons, used to garden work, will easily set 4000 or 5000. The job of planting an acre is therefore equivalent to probably not less than twenty-five days' work, and in some cases this estimate may be considerably exceeded; but the amount of thirty dollars should certainly be enough to pay for the whole job, when we pay boys fifty cents, and more experienced persons one dollar or one dollar and a quarter for a good day's work.

Transplanting so many onions may be a costly operation, but it relieves us of much, if not all, hand weeding, and entirely of the job of thinning. Old onion growers know something about the tediousness and costliness of these operations. The saving, in these respects, more than pays for the labor of transplanting.

"How far apart shall I set the plants?" That is the next thing the novice wants to know. I have for years made the rows an even foot apart, and crowded

the plants as much as I dared to in the row, in the attempt to secure the largest possible rate of yield. My motto was: "No use wasting space and opportunity." But I got over that notion. I find that I can give the patch better attention, more thorough and continued after-culture, if I make the rows fourteen inches apart, and set Gibraltars four inches, and Prize-takers not less than three inches apart in the rows. It is only when I plant onion seedlings to be pulled up early for green or bunching onions (and they are admirable for that purpose) that I crowd them to two inches in the row.



Fig 17—OLD STYLE GARDEN MARKER

For garden markers, we have almost up to this time relied chiefly on homemade affairs, such as the one shown in Fig 17. This has the one great disadvantage of compelling the operator to walk backward or sideways. A set of handles might be attached at the rear by which one person can do the steering while another pulls it along horse-fashion. I now have discarded this implement altogether.

For marking out the rows for onions in smaller patches, up to one-eighth or even one-fourth acre, I commonly use an Iron Age hand wheel hoe, fitting it for that particular purpose by removing the side hoes, and adjusting the single-tooth attachment shown in Fig 18. With this I can make lighter or heavier furrows, by bearing more or less heavily on the han-

dles. It is especially useful for loosening up the soil in the furrows when it has become somewhat hard or packed. When simply marking out for setting the plants, I take the regular marking attachment from the drill, and put it on this tool. During the earlier part of the season, or during the entire period of setting onion plants, I keep one wheel-hoe fixed in this manner right along, as then the time for using it as a hoe has not yet arrived, and the marker is needed about every day.

Gardeners who work with the Planet Jr combined wheel-hoe and drill, may transform it into a three-



Fig 18—SINGLE TOOTH
ATTACHMENT

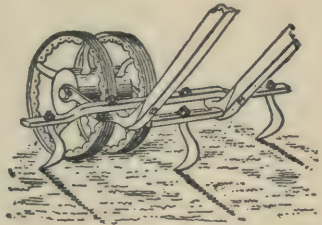


Fig 19—THREE-TOOTH MARKER

tooth marker as suggested in Fig 19. If properly made, it will give good service. I suggest still another plan—simply an idea of my own. How would you like a marker devised on the principle of the dress-maker's tracing wheel? I believe it can be pushed and managed more easily than any other marker we have yet mentioned. The little wheels may be turned from hard wood. The construction is easy and so simple that it will be unnecessary to give details. See Fig 20.

Straight and uniform rows add largely to the attractiveness of the patch, even if they were not of practical usefulness in facilitating the work of cultivating, and perhaps otherwise. Whatever marker we

use, therefore, we take the utmost pains to get the rows perfectly straight. When we start in right once, the rest is easy enough. Usually I get the first row in straight line, if it is a rather long one, by setting three stakes as a guide. We begin straight and try to keep straight. It eases our conscience, and avoids offense to the eye. I now mark only one way, leaving it to the eye, to practice, and to good judgment, to maintain the proper distance between the plants in the row.

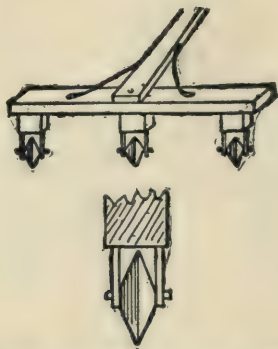


Fig 20—TRACING WHEEL MARKER

How is the planting done? In the first place it should be remembered that plant setting, like seed sowing, is always done most easily and most conveniently when the ground is freshly prepared. We can then set nearly or fully twice as many plants in the same length of time, as a few days later after the ground has again become hard or packed down by rains.

If the ground is freshly prepared, and as loose and mellow as we should expect it under the circumstances, I prefer to set the plants with the fingers alone, and without the use of a dibber. It is a simple

and quick operation, too, and for myself, I could, if I wanted to keep at it, easily set 6000 plants in ten working hours. I take hold of the plant with the left hand, place it with the root end just a trifle to the right of the place where I wish to have it planted, and then with the thumb or index finger of the right hand press the bulb or lower end of the plant down into the soft earth until it stands just where I want it. This is the work of a very few seconds, and all

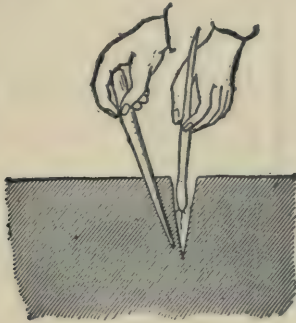


Fig 21—SETTING THE PLANTS WITH DIBBER

I have to do afterward is to run the fingers over the ground near the plant to fill up the hole left by the manipulation, smoothing the surface.

My plan is to have a patch planted as quickly as possible after the ground has been put in shape, and it will usually pay well to get extra help to do it, rather than string the work along by keeping only a small force at it. If by any chance we have to quit and let the soil become hard and packed, I always try to refit it anew by harrowing and marking, before going at the plant setting business once more.

If plants have to be set into hard soil, a small dibber will be needed. This may be made of a piece

of seasoned hardwood, six inches long, one inch in diameter at large end, and tapering to a point at the other. The operation of setting the plants with the dibber is made so plain by the accompanying illustration (Fig 21), that little explanation by words will be needed. Open the hole with the dibber and insert the plant an inch or so deep. Then strike the dibber into the ground an inch or so back of the plant, and,



Fig 22—OLD KITCHEN KNIFE AS DIBBER



Fig 23—DIBBER

using the lower end as a pivotal point, draw the upper end toward you, thus pressing the soil firmly against the underground part of the little plant. This, of course, leaves another little opening a little back of the plant. This may be closed, and the surface somewhat smoothed by another light stab or so with the dibber, or a simple manipulation of the fingers.

A broken kitchen knife ground to a point (see Fig 22), or a little flat steel dibber with handle, such as shown in Fig 23, and as may be made by any black-

smith at small cost, will always do good service. In opening the hole have the flat side of knife or dibber facing you. Then insert the plant back of the dibber, withdraw the latter and strike in again back of the



Fig 24—TRIMMING THE PLANTS

plant, pressing the soil against the roots in the same manner as was done with the wooden dibber.

A good way of managing the whole operation is as follows: Take up a lot of plants from the seed bed, which may be done by running the point of a small trowel under them, and lifting them out. Carefully separate and straighten them out. Next trim

off a part of the tops, if long and slender, and the ends of the roots, as shown in Fig 24. The work of setting out the plants is more conveniently done, and will proceed much faster when the plants are short and stiff than when they are left encumbered with an excess of flimsy growth at each end. Besides, the untrimmed plants are liable to bend or fall over, and be in the way of the wheel-hoe and in danger of being torn out; while the trimmed plants stand up straight

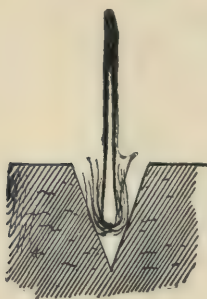


Fig 25—WRONG WAY

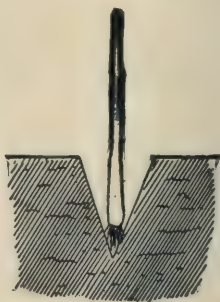


Fig 26—RIGHT WAY

and stiff from the very start, and allow the use of the wheel-hoe immediately after they are set out.

In short, I believe in shortening the plants at both ends very thoroughly. It will do no harm, and may do some good to trim the roots away to within almost a half inch of the bulb or stem. With long roots left on, some of the boys are bound to set the plants in the manner shown in Fig 25, while the plants with short roots are more likely to be properly planted as shown in Fig 26. The new roots start out directly from the end of the stem, and the plants with closely trimmed roots will usually take hold of the ground more promptly than those with all roots left on.

When the plants are thus prepared for setting and bunched off, let a boy take a basketful of them and drop them in bunches just ahead of the planters. Of course, the work should be begun just as soon as the ground can be got in proper shape. The soil must be moist and crumbly, but not wet or sticky. Begin



Fig 27—PLANT SET RIGHT DEPTH

with the plants that were started first, or are largest, and carry the job to completion as speedily as possible.

The question is often asked how deep onion plants should be set. An onion plant will live and make a bulb whether you set it a half inch or three inches deep. But we want the bulb to grow pretty well out of the ground. This seems to be the nature of the onion plant. In order to show this in a theoretical

way I have drawn the illustrations which picture the objects in reduced size. Fig 27 shows the plant set one inch deep, the roots reaching further down, and before long probably finding their way clear down to the subsoil. The bulb will spread out to full size as indicated by the dotted lines. This brings it just

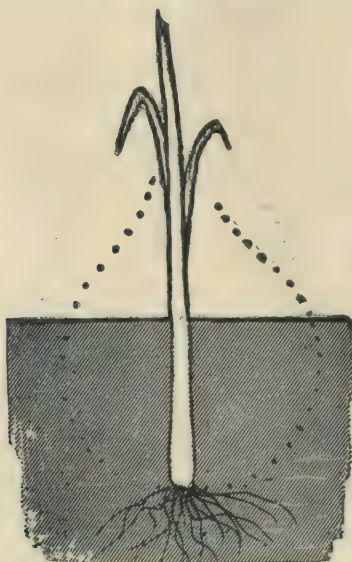


Fig 28—PLANT SET TOO DEEP

where we want it, namely, two-thirds or more above the surface of the ground, where it can be easily worked and harvested. In Fig 28 the plant is shown as being set one and one-half inches deep. If planted in a dry time, and in dry soil, the roots may find more moisture and the plant revive more quickly after the transfer, but the bulb is rather too far down in the

ground. Altogether I believe that one inch in depth is just about right.

Efforts have been made by a number of persons, to my knowledge, to construct a machine which will set onion plants expeditiously and in a perfect manner. Thus far I have not seen the machine that will do better and quicker work than a nimble-fingered, active and willing youngster or man. And yet the possibility of finding such a machine, after a while, is by no means excluded. We will welcome it whenever it makes its appearance.

CHAPTER IV

A Perseverance That Pays

TILLAGE AS MOISTURE PRESERVER AND WEED KILLER

Little needs be said to the expert gardener about cultivation and its objects. He knows the importance of keeping the soil well stirred among all garden crops in general, and among onions in particular. "Tillage is manure" is an old saying. In the present case, however, we care little about the manurial effect, for we have provided plant food in great abundance. The great benefit we expect from cultivation is the preservation of moisture, and incidentally, the destruction of weeds. An inch or so of loose soil acts as a mulch, and a most excellent one at that, which prevents the rapid evaporation of the soil water. The moisture rises through the compact soil, by means of capillary action, until it reaches the stirred portion. Here its progress is arrested, and the only way to reach the surface, and escape in the air, is by evaporation, which is greatly retarded by the loose layer of soil.

The chief tool required for the process of soil stirring is a good hand wheel-hoe, such as the Iron Age shown in Fig 29 or the Planet Jr, or any of a number of others that you find on sale at seed and supply stores. One of these tools you should and must have. It is absolutely indispensable. I never use the vine lifters even when using my Iron Age as a row straddler. Sometimes I can do even more satisfactory work with it, when I use it as a single wheel-hoe and, reversing the hoes, go between the rows. You

may try both ways and select the one that seems to work best.

We begin running the wheel hoe over the onion patch a few days after the plants are set out, and repeat the operation just as soon as there is the least sign of a crust over the surface. The aim is to keep the mulch of loose soil on the ground all the time. Running a wheel hoe in clean mellow soil is not heavy work. The average boy will rather enjoy it. In real-



Fig 29—IRON AGE HAND WHEEL HOE

ity it is probably the least tiresome work in the whole business. An acre can be gone over by one person, even a boy, inside of one day. Fig 30 represents a youngster pushing the wheel-hoe in the onion field.

Usually we begin operations with the double wheel-hoe, straddling the rows. As the season advances we change to the single wheel-hoe (Fig 31), running it between the rows.

"Is no hand weeding to be done at all?" you may ask me.

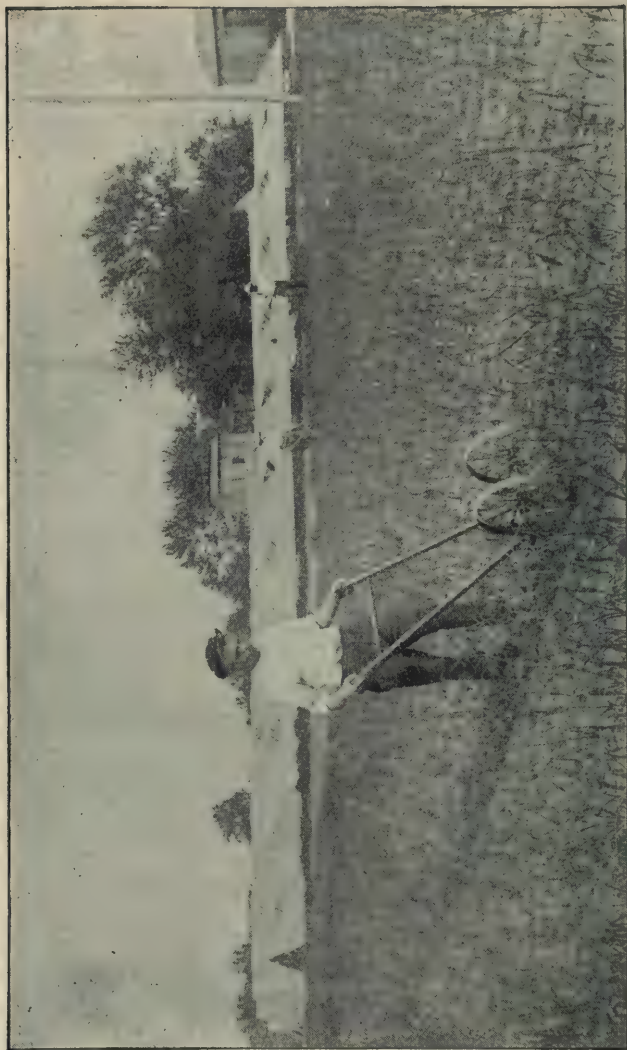


Fig 30—WHEEL HOE IN OPERATION IN THE ONION FIELD

That depends. If the soil is of weedy character, or the patch is neglected for any length of time, we may find considerable work—and disagreeable work—

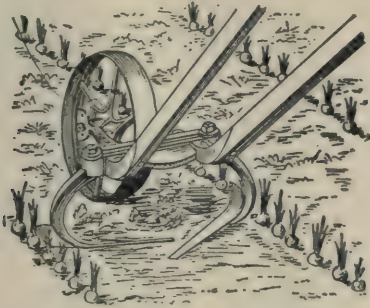


Fig 31—SINGLE WHEEL HOE

to do on hands and knees. With timely attention little is needed, and that little can be done very effectively by means of Lang's hand weeder, or of a kitchen



Fig 32—LANG'S HAND WEEDER

knife, the blade of which is bent in the shape of a curve, and sharpened on both sides. The way the hand weeder is used is illustrated in Fig 32. There are other styles of hand weeders in the market, and almost any of them answer their purpose first rate.

A most excellent tool for taking out the weeds in the rows from between the plants can be easily made from an old worn-out hoe, leaving the lower part (between the corners) only about two or two and one-half inches wide, as shown in Fig 33. With this sharp-cornered tool you can strike between the plants, cutting out the weeds, and loosening the soil. This manipulation and the free use of the wheel-hoe will usually be all the cultivation needed. But the hand which wields the sharpened hoe should be a careful one, and be guided by a head possessing a

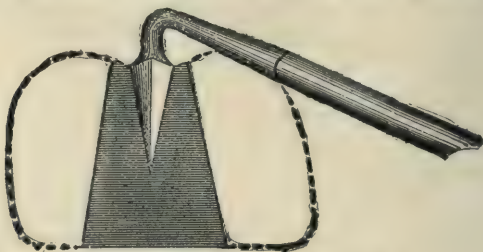


Fig 33—HOMEMADE ONION HOE

fair degree of intelligence, otherwise the onion plants may have to suffer.

Will it be feasible to substitute a mulch of fine manure or other litter for cultivation and weeding? I do not think so, unless it be on sandy soil and in a very dry season. The plan works well in growing celery. It may be tried, cautiously, for onions. In a wet season it will increase the tendency of the plants to make scallions. I have, however, had reports from several intelligent growers who told me that they had used a mulch in the onion patch with excellent results in a dry season.

A continuous supply of moisture, furnished by sufficient but not excessive rainfall, makes a large yield

reasonably certain. Whether irrigation can be made to take the place of the natural water supply, is still an unsolved problem, at least with us. An oversupply at any time is liable to produce a large proportion of scallions, and the bulbs will be of inferior quality and prove poor keepers. Even in irrigation countries, in no case is it advised to irrigate oftener than once a week.

CHAPTER V

A Timely Pull and Haul

WHEN AND HOW TO HARVEST THE CROP

Now we come to an important point in our undertaking. A little neglect in pulling and hauling may result in great damage, if not ruin to the crop. I know whereof I speak. When grown by the new method, the onions mature several weeks earlier than they would if grown in the old way. If the mature bulbs are left in the ground, especially if ripened somewhat prematurely by a dry spell in July and August, and a long period of rain should follow, as sometimes happens, growth will be renewed; and we might just as well try to make water run up hill as attempt to stop an onion from growing when once started. Of course this second growth ruins the bulb for the market, unless for immediate use.

A lesson which I have learned by costly experience is, that the crop should be pulled just as soon as the bulbs have reached maturity.

"How am I to know, when the onions are fit for pulling?"

The tops fall over at maturity and begin to waste away, the substance being gradually absorbed by the bulbs. So, when the majority of the tops are dying down, your time has come. Don't wait any longer, especially if it is getting pretty well along in the season.

Some of the tops may yet be green and standing up like soldiers, but it matters not. Pull the crop and leave on the ground. The bulbs will absorb the substance of the tops, and the latter dry away.

Dry weather is very desirable as long as onions lie on the ground to cure. If rain comes, it is well to rake them over carefully with a lawn rake or wooden rake with dull teeth.

"How long should the onions be left on the ground to cure?"

It may take a week or more of dry weather. At any rate the best thing that can be done is to gather the crop, even if only partially cured, and put it under



Fig 34—ONION CURING SHED

shelter—in open sheds, lofts, on the barn floor—anywhere where dry and airy, and where the onions can be spread thinly on a dry floor.

If necessary, work them over, which may be most conveniently done by means of a wooden scoop or shovel. Of course, the afternoon of a dry day is the best time for gathering and hauling the onions, for they should be perfectly dry on the outside, and no dew or rain on them when put under shelter. In such places they may be left until perfectly cured, *i e*, until the tops have almost entirely dried away.

A shed suitable for the purpose of storing onions is shown in Fig 34. The dimensions for such a shed

may, of course, be varied to suit the needs of the grower. All the bins are made of slats, with spaces between for free circulation of air. In rainy weather the sides may be covered with canvas or adjustable boards.

Of course, the spaces between the bins should be large enough for convenience in manipulation. When the onions are well cured, and gathered when perfectly dry, there is, however, very little risk in storing them in a layer several feet thick on a barn floor or loft,

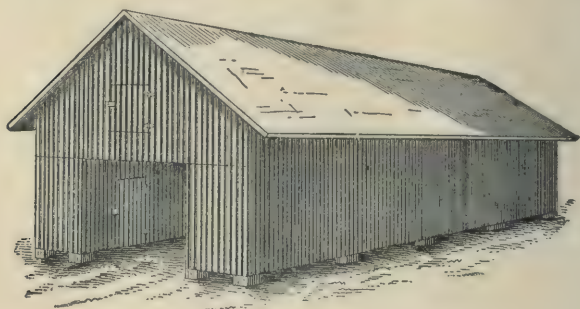


Fig 35—AN ONION CURING CRIB

where thoroughly protected from moisture. Handle and sort them over for market as convenient, and certainly before there is danger of their freezing.

Mr Henry Price, an extensive grower, has furnished me description and plan of an onion curing crib built by him recently. He says it is in reality only a double corn crib. It is eighteen feet wide and eighty long, with a ten-foot driveway in the center the whole length. This leaves the width of crib on each side four feet; its height eight feet. The building is lathed all around, inside and outside, similar to a corn crib, as shown in Fig 35. Of course, it can be put up to suit the notions of the persons building it,

and quite cheaply, if desired. Ordinary rough posts, cut in the woods, set into the ground three or four feet deep, may serve as a framework. I think I would divide the storage rooms on each side into shelves, making at least four of them, each two feet deep. The onions can then be stored twelve to eighteen inches deep, leaving space enough for free airing and drying between the layers. The loft may also be used for curing onions, or for storing corn and for other purposes.

If we could depend on dry weather right along, we might easily dispense with a curing shed, lofts, etc, as the bulbs will cure very well outdoors. In a dry spell we can even leave the crop unharvested for some time after it is ready for pulling. But this is not a safe way. Many onions are lost, or much deteriorated in value, by being left unharvested too long.

Any ordinary corn crib, or a dry loft in the barn, may be utilized for a place to store onions during late summer and fall. Of course we don't expect to winter them in any place where exposed to repeated freezing and thawing. Gibaltars are not a good keeper. Prizetakers when well matured and cured can easily be kept until spring, and in some cases it may be very profitable to do so.

J. G. Rawley of Michigan gives in *American Agriculturist* the following description of his newly erected onion storage house. (See Fig 36.)

"The storage house shown here is located on the south side of a hill and faces south and east. It is forty feet long by twenty-four wide, and has a stone basement. The stone walls on either side are seven and one-half feet high and two feet thick; wall at west is twelve feet high, the one at the east end eight feet. There are two stories above the basement. The

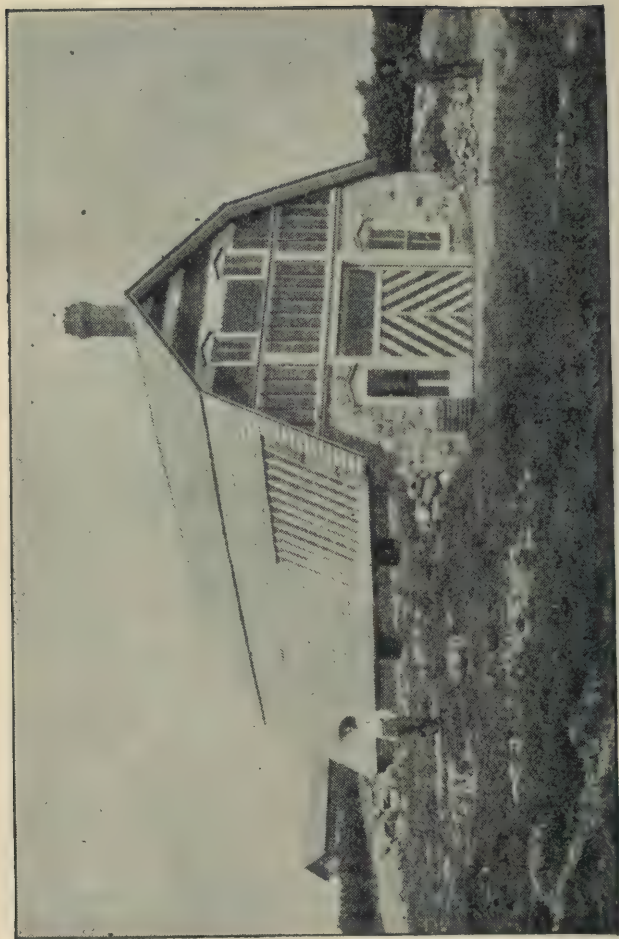


Fig 36—ONION STORAGE HOUSE BUILT BY J. G. RAWLEY OF MICHIGAN

floors are formed of boards three and one-half inches wide by one and one-fourth inches thick, with a half-inch space between boards. The roof is made of matched lumber, well put together, covered with several thicknesses of building paper and shingled. The interior of the building is lathed and plastered and the onions will stand zero weather without freezing.

"On the ground floor there is an alley into which a wagon may be backed for convenience in loading. The building is provided with a return steam heater, so that it may be warmed in coldest weather. There is also a forcing window on the south side, next to the east end. The cost of storage house, steam heater and 1000 crates for onions was \$1000.

"When well cured I store my onions with tops on, and they keep just as good as hay that is well cured. They are not topped until cold. For convenience in putting in the crop, there is a track on the west end of building running from the ground to top floor. The onions are carried up in a small car and dumped into the bins below."

An additional word of warning will be in place. Never leave onions, no matter how well cured they may appear, in large heaps or in boxes, crates or barrels longer than a few days at most before you pick them over and remove the dead tops, roots and other rubbish. When the onions are once thoroughly cleaned and perfectly dry, they will keep well if stored in slatted crates, or ventilated barrels, etc, otherwise they will sweat, gather moisture, and begin to grow again, or possibly become infected with rot. Neither is it safe to store even clean and supposedly dry onions in tight barrels or boxes for any length of time.

CHAPTER VI

The Fragrant Bulb on Sale

Now after harvest we will take an inventory of the stock that we have in our possession ready for turning into cash:

What do we have?

First, a lot of Gibraltar onions—mammoth bulbs weighing from three-fourths to two pounds apiece, or fully up to the size of the imported Spanish onions found in our stores; a little lighter in color, but if grown on sandy soil and well cured, just as perfect and as handsome, and undoubtedly even milder in flavor and finer grained than the imported, and less subject to the rot which spoils a large percentage of the imported bulbs, sometimes even before they come into the hands of the groceryman. I will not deny, however, that the Gibraltar is subject to the attacks of a black fungus which apparently comes from the outside, causing at first a discoloration on one side, and finally ending in a softening of the tissues. This rot may become a serious matter if we try to keep the bulbs for any length of time, and I usually, in such case, lose several per cent of my stock from this cause. It is for this reason that I urgently advise growers of Gibraltar onions to put the crop on the market as early as possible after the bulbs are harvested.

While I, under my conditions, find it advisable to clean up the Gibraltar crop by November or December, I have reason to believe perfectly sound and well cured bulbs of this variety may be kept much longer in good condition if stored in a cool and perfectly dry place.

I find the demand for them, however, more brisk earlier in the season.



Fig 37—A BUNCH OF PRIZETAKER ONIONS

The Prizetaker onion is a much better keeper. I want a portion of my onions to be of this sort, for holding until the increased demand later in the winter or toward spring. It is then, usually, when our

grocers ask five or more cents a pound for the imported Spanish bulb. I can see no reason why we cannot meet the demand for a sweet onion at this time, or at any other, with our domestic bulbs, which are at least as good in every way as, and possibly better in some respects than, the foreign importation. If it is only a foolish notion that got into the handlers or consumers of sweet onions that makes them consider the imported Spanish article superior to our own production, it only remains for us to teach them better things and the truth in the matter.

The stores in my own vicinity sell very few imported Spanish bulbs after I begin to supply home grown Gibraltars and Prizetakers to them and to consumers. Whoever once buys and tries our own, becomes at once a convert to the principle of patronizing the home trade, not for sentimental or patriotic reasons, but for the sake of the better product and the better bargain, and for the recognized superiority of the home-grown bulbs. People who have proper onion storage facilities will find no difficulty in keeping the Prizetaker sound and perfect until spring, and in finding quick sale for it at a good price. A few fine specimens for home use may be kept for a long period in perfect condition by being tied and hung up in a frost-proof garret, as shown in Fig 37.

Years ago I hit upon the plan of crating up the choicest bulbs in the same way as the imported article, thus competing with the foreign product in our city and town markets. This is now proving quite a profitable method of marketing the bulbs of the crop. The crate shown in Fig 38 is similar to the one in which the imported Spanish onions are put up. End and middle pieces are seven inches wide and nineteen and one-half inches long. The slats which form the sides, as shown, are nineteen and one-half inches long

and two inches wide, and there are sixteen of them required for each crate. The crates will cost about ten to twelve cents apiece. Possibly, by substituting split stuff, such as the orange growers use for their



Fig 38—PRIZETAKER ONIONS CRATED FOR MARKET

orange boxes, instead of sawed slats, the cost per piece could be reduced to below ten cents.

I often put bulbs in these crates that I would not dare to ship in barrels. Sometimes we have large fine bulbs that are imperfectly capped over, and therefore not fit for long keeping. It would not be safe or good policy to put them up in bulk, and under ordinary

circumstances they would represent just so much waste, or at best, we might be able to sell them as "seconds" for a reduced price to somebody who would want them for immediate culinary use. Such bulbs will often answer very well for mixing with others in the fancy crates, as they are usually sold and used without much delay, and as dealers who handle imported Spanish onions are used to just that kind of imperfect bulbs, and to their deterioration and decay when kept for some little time.

To give an idea of the size of these crated Prize-takers, will state that the number of specimens contained in each crate ranged from fifty to sixty, only in rare cases reaching the latter figure. The large specimens on the table in front of the crate weighed about one and one-fourth pounds apiece. A foot rule appears lying across the two at the right to show their diameter.

In the following I give the experience of my friend, J. S. Woodward, of Lockport, who has grown Prizetakers quite extensively for a number of years. The soil on which they were planted was a rich, sandy muck, and his crops were immense. Like me, he had crates made in imitation of the imported Spanish onion packages, and of the dimensions already given. A crate of this kind holds something less than a bushel of onions, between three and four pecks, or nearly fifty pounds (the weight of a bushel of onions in this state usually being taken as fifty-six pounds). Mr Woodward would send a sample crate of Prize-takers to some reliable commission house each in Boston, Philadelphia, Pittsburg, New York, etc, and solicit orders for a carload. Thus he has shipped his crops, in carload lots, to dealers offering him best prices, and he has had no trouble in disposing of his large bulbs in this way, receiving for them from

seventy-five cents to one dollar and thirty-five cents per crate, or an average of close to \$100, and thus making the business pay him quite well.

There are chances everywhere of selling at least a portion of the crop directly from the field. My emphatic advice is to sell all that can be sold at a fair price. Get rid of the onions, and pocket the money. With the crops of Gibaltars and Prizetakers that I usually raise, I can make more money from them selling at sixty cents a bushel, than I possibly could by growing Danvers, Yellow Globe or any other on the old plan, selling them at one dollar a bushel. It is surely no small job to take care of a crop such as can be grown on a single acre. It's a big thing. Never lose sight of that fact.

I imagine some people will wish to know how onions can be most successfully wintered over. Under some circumstances it may pay well to store and hold them for spring sales. An onion storage house found on the grounds of a grower in Michigan has already been described in a preceding chapter. There is a party over in Canada who grows quite a number of acres of onions every year, and he invariably holds them until spring, and makes money by so doing. Of course, I was anxious to learn how he winters such big crops, and made inquiry. He wrote me as follows:

"For the purpose of keeping onions during the winter we have erected two large rooms in the end of our barn, above ground. These rooms are almost frost-proof in the coldest weather; are provided with double windows at each end, and double doors at entrance from driveway on barn floor. All the walls have a dead air space. Building paper is tacked on in the inside of each boarding that forms the hollow space.

"Onions are not put into these rooms in bulk, but in thousands of slatted bushel boxes. The windows are kept constantly open, except in very cold weather. The idea is to put in dry, well cured stock, and place it in such a way that it may always be airing at suitable times, and yet be secure against low degrees of temperature."

Be sure to bear in mind the following general hints: Never attempt to keep onions that are not capped over perfectly, and not entirely dormant, both at top and root part. If they are thus perfect, it will not be a hard task to keep them over winter, provided you have a dry, cool and airy room, where you can keep them from freezing. Never store them in a large bulk together. Onions will also keep quite well when frozen. Store on the floor of some out-building, say fifteen inches deep, and as far away from the wall. When frozen cover with a two-foot layer of hay; but do not handle them.

CHAPTER VII

All's Well That Ends Well

ADVANTAGES AND PROFITS OF THE NEW WAY

That the new method of onion growing gives us a great increase of crop, besides many other advantages over the old way, is no longer a matter of doubt. The great question now is, whether the new way is also the more profitable one, and if so, how profitable.

We have already seen that the transplanting method calls for one and a half to two pounds of seed per acre, while ordinarily not less than six pounds are sown. On the other hand, we have the additional labor of growing plants in frames, which is more than an offset for the saving of seed. The new way requires the considerable and tedious labor of transplanting, an operation which will cost at least twenty-five dollars per acre. On the other hand, we save so much hand labor in thinning and weeding that one might well be considered an offset for the other.

On the whole, we have come to the conclusion that the expenses of the crop, up to the time of harvesting, are very near the same, whether we follow the new or the old method. The chief advantages of the new onion culture, therefore, are clear gain. Among them we have:

1. Earlier ripening of the crop. With six weeks to start in sowing, the crop will come to maturity several weeks earlier than it would otherwise. This gives a chance for marketing the earlier sorts much in

advance of competitors who adhere to the old onion culture, as also in clearing the ground for a succeeding crop, such as celery, turnips, fall spinach, etc, while the season is made considerably longer for the late Prizetaker, which otherwise has hardly time at the extreme North to come to a full development.

2. A decided improvement of the bulbs in respect to shape and uniformity.

3. Quicker sale and better price, in consequence of the finer appearance of the bulbs.

4. A greatly increased yield, to the extent of doubling that obtained by the ordinary method.

5. The elimination of all uncertainties from the business. Even failure would mean what people now call a "big crop." Nothing short of hail and flood could prevent a good profit in this new onion culture, if managed with ordinary intelligence and care.

It requires particularly suitable or favorable conditions, and a considerable amount of skill, to produce a big crop of onions by the older method. Anybody of good common sense, even if of little practical experience or unusual skill, who has a fairly good patch of ground, can, if he wants to, grow a crop of Gibaltars or Prizetakers of which he may be proud.

The following is a somewhat rough estimate of the expenses and receipts on the basis of my own experience and surrounding conditions. Supposing that only 1000 bushels are grown per acre, we then have the following:

EXPENSES OF CROP PER ACRE

Raising the plants.....	\$20.00
Rent of land, one acre.....	5.00
Manure.....	45.00
Superphosphate, 400 pounds.....	2.40
Muriate of potash, 250 pounds,....	5.60

Nitrate of soda, 200 pounds.....	\$4.50
Applying manure, etc.....	16.00
Plowing and harrowing.....	4.00
Marking	2.00
Seed	3.50
Transplanting	27.00
Cultivation and weeding.....	20.00
Pulling crop.....	5.00
Gathering, hauling, crating.....	40.00
Crates, etc.....	100.00
Total	\$300.00

RECEIPTS

By 1000 bushels of onions at 75 cents.....	\$750.00
Less expenses as above.....	300.00
Net profit.....	\$450.00

This seems to me a perfectly safe estimate. In some cases the grower may realize more than seventy-five cents per bushel, and his profits will then be correspondingly increased. In other cases he may have to accept even a smaller price than given in this estimate. But even if these fine bulbs should not bring more than fifty cents a bushel, or \$500 for the whole crop, the profits will still be \$200, after all expenses, every bit of labor included, have been paid.

In a good onion season the crop should not be less than 1000 bushels per acre, if properly managed. If it exceeds this amount (and 1500 bushels per acre is an easy possibility), this would add to the expense in harvesting and marketing, and increase the total expenses of the crop, but it would also increase the net profits accordingly.

What other crop could be expected to give similar results and with greater certainty? I am unable to name a single one among ordinary farm or market garden crops that holds out greater promises of satisfactory results.

If the outcome comes near to meet the estimates here given, the grower, after all his pains and expenditure in the venture, may well say, "*All is well that ends well.*"

CHAPTER VIII

The Old Onion Culture

"Our father's way
Was the good old way,
Brought home and land,
And cash to hand
We'll not despise the good old way."

Many of the details of onion growing told in the preceding pages apply both to the old system and the new. Some additional information concerning what some young growers may consider "the good old way," will undoubtedly be acceptable to many readers.

No matter under what system the crop is to be grown, I would select manure and prepare the land as advised in the second chapter. Low lands of mucky character are used in many localities with excellent results. Yellow Globe Danvers and Early Red are well suited for such soils. The crops are often very large, but the individual bulbs hardly as firm as when grown on uplands.

Make the seed bed perfectly smooth with Meeker harrow or steel rake. It is not necessary to mark out the ground. For business operations, and by this I mean for purposes more extensive than the production of a mere home or family supply, a good seed drill is indispensable. At the present time, the leading garden drills are the Planet Jr and Iron Age. Fig 39 shows the latter in operation. The one advantage of this and similarly constructed drills is that you can keep

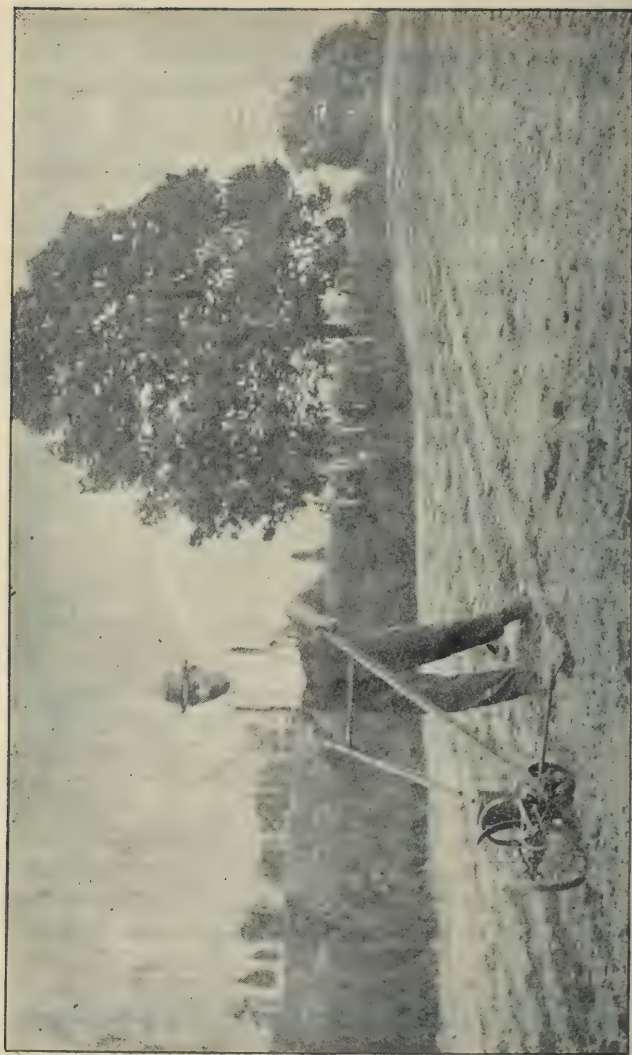


Fig 39—IRON AGE GARDEN DRILL IN OPERATION

watch of the seed in the hopper, and also note how it is deposited. Before sowing seed, it may be advisable to test the machine, and its delivery of the seed. Place a bed sheet or a row of sheets of paper on a barn floor; put some seed into the drill, set the drill as you think it should be and sow along upon the sheet or papers. Of course you want seeds deposited perhaps twice as thickly in the row as you will want the plants to stand. Some seeds will not grow, or the young plants may die. It will be better to be compelled to thin the plants a little than to have large spaces in the rows without plants. Thinning is easier than filling in with plants, although both operations are only too often neglected to the great injury of the crop or yield.

When sowing seed with the drill, I begin by stretching a garden line along one side of the patch, a few inches from where I want the first row. This serves as a guide, and I take great pains to have this row and all the following ones perfectly straight. Sow as early in the spring as soil and season will permit.

The opening marked for onion seed in the Planet Jr drill lets the seed run out pretty freely, perhaps at the rate of eight pounds to the acre, and when the soil is in first rate order, and the seed fresh and good, as this always should be, I usually let the seed run through the next smaller opening, which sows five or six pounds per acre.

The Iron Age drill, when the indicator is set to point to the onion mark, sows from five to seven pounds of onion seed per acre. I now make the rows fourteen inches apart, and when sure of the freshness of the seed, try to sow about five pounds to the acre. Consequently I usually set the indicator just a trifle short of the onion mark, thus making the discharge opening a little bit smaller. The small roller attached

to the seed drill firms the soil sufficiently to insure prompt germination of the seed.

The weeds have to be watched much more closely than in the new onion culture. The roller marks indicate where the rows are, and the wheel-hoe may be set agoing, carefully, **at** first, even before many of the plants have broken ground. Then keep it agoing.

Next comes hand weeding, which should be begun as soon as weeds can be seen. Scrape the soil away from the rows. Never draw it up toward them. Repeat as often as needed, at the second or third weeding also pull up the plants that are in excess of a fair stand. This I find much the better way. It makes the crop more uniform, and therefore more valuable and more satisfactory. Ordinary varieties should in no case average more than one plant to the inch, where they stand most crowded, and they should have more space on very rich soil than on one not sufficiently enriched. The after-treatment of crop, harvesting, etc., is exactly the same as described for the new onion culture.

For many years the Yellow Globe Danvers has stood at the head of onion varieties to be grown for market and for general purposes, in the old way. In many instances I now find it outranked by the Southport Yellow Globe. Both are excellent sorts, however, unequaled, in fact, by any other. Prizetaker has given almost as good crops, in some instances, although later, when grown directly from seed, as when grown by the new transplanting system. The Australian Brown is liked by some growers for its earliness, reliability for bottoming, and unexcelled keeping quality. The claim is made for it that it can be kept in good condition, sound and without sprouting, for a whole year, that is, until bulbs of the succeeding crop are fully matured. I have not been shiningly

successful in my attempts to grow this onion, either from seed direct or by transplanting, for which I blame my lack of skill and, possibly, of opportunity.

I have already stated my opinion of red onions. I do not want them. My markets almost reject them.



Fig 40—COMPARATIVE SIZE OF ROUND ONIONS

They are not particularly popular except for some special purposes in special localities. As a standard red market variety, Red Wethersfield has always stood at the head. It is immensely productive and a good keeper.

Extra Early Red is a very early deep red onion

of medium size. I believe we have both a flat and a round strain of it. It is recommended especially for the extreme North and Northwest, and for cold and mucky soil.

Southport Red Globe is the exact counterpart of Southport Yellow Globe, only of a rich deep red color,



Fig 41—COMPARATIVE SIZE OF FLAT ONIONS

and, like the other, as handsome an onion as could be imagined.

Of the white sorts, I only recognize one, namely, the Southport White Globe, as a variety worthy of consideration for general market purposes. It is, like its yellow and red counterparts, a strikingly handsome onion and a fairly good keeper; but it does not find favor in our markets equal with the yellow onions.

The form and comparative size of round and flat onions are shown in Fig 40 and Fig 41.

Much of the ultimate outcome of every attempt to grow a paying crop of onions depends on the quality and freshness of the seed. Sometimes two-year-old seed, when well kept, does very well. I have frequently had it germinate promptly, and grow as vigorously as fresh seed. In other cases it absolutely refused to grow. So I always prefer to use strictly fresh onion seed. If you will do as I do, namely, buy your onion seed early, of a reliable seedsman, and test it before you plant it, so that, should it fail to germinate as it ought, you may be able to secure a fresh supply before planting time, you will be reasonably safe from loss and disappointment on account of poor seed.

ONIONS FOR PICKLING

This branch of the business can often be made to pay well. At one time, not long ago, I was quite enthusiastic over the possibilities of the pickling onion as a money crop. But not having the right kind of soil, which should be very clean and very sandy (no other will do), I finally gave it up beyond the extent of home production. There is usually a very good demand, almost everywhere, for really fine bulbs for pickling purposes, especially during August and September. The sight of a well graded lot of Barletta (also sent out as White Queen) onions will delight and tempt any housewife. Neither will she be apt to find fault with the price if you ask her ten or twelve cents a quart for them. At wholesale they have recently been bringing about two dollars or two dollars and a half per bushel. On my heavier loam I find it much easier to raise two dollars by setting out 250 or 300 Gibraltar or Prizetaker seedlings than by sowing an eighth or a quarter pound of Barletta seed. But

you can try the Barletta if you have the right kind of soil for it, especially a clean, clear sand.

The general management of the pickling crop is the same as for market in the old way, only that you must sow more seed, say from forty to fifty pounds to the acre, and leave every plant to grow. The rows may be put nearer together than for large onions. Ten inches apart is sufficient, unless considerations for convenience in cultivation induce you to put them

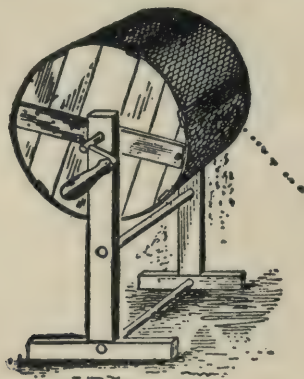


Fig 42—HOMEMADE PICKLING ONION SIEVE

twelve inches apart. The seed, of course, is sown with the garden drill. We have to be very careful in this operation so as to use the proper amount of seed, and yet prevent waste. Sometimes I sow only half the amount of seed at a time, and go twice in the same row, thus spreading the seed over a space of nearly two inches for each row.

When ripe enough for gathering, here usually early in August, the Barlettas need prompt attention. Just as soon as the most of the tops have fallen over, the onions are pulled or taken up with a garden trowel,

and thrown into a sieve having about four meshes to the inch, so that the dirt and sand may be sifted out; or they may simply be left on the ground for a day or two to cure, provided the weather remains dry. Then gather them up, preferably on sieves such as used for drying raspberries and other fruit, and store under shelter where they have a good chance to dry out thoroughly. Afterward they can be cleaned and sorted. I use a sieve for cleaning pickling onions and



Fig 43—ASSORTED BARLETTA ONIONS

onion sets. This is a simple homemade affair, shown in Fig 42. The screen used has four meshes to the inch. The mechanical genius of the family will have little difficulty to construct a sieve or drum like mine or similar to it. Put a moderate quantity of the little onions into this drum, let them get quite dry, and then turn until they are clean. They may then be sorted, which is easily done by running through a coarse meshed sieve (meshes to be about three-fourths inch), and are then ready for use or sale. The usual sizes into which they are assorted are shown in Fig 43.

Housewives often complain of the trouble they have in cleaning small pickling onions. This is simply

because they do not know how to do the job properly. Put the bulbs—tops, roots and all—in weak brine for a day or so. Then there will be neither hard work nor the shedding of tears over it.

GROWING ONION SETS

For growing sets the following hints will suffice: Select Silverskin for white, Early Red for red, and Yellow Dutch (or perhaps Yellow Danvers) for yellow, and sow seed at the rate of forty to sixty pounds to the acre. Handle in somewhat the same fashion as the pickling onions. All that will not pass through a sieve with three-fourths-inch meshes are too large for sets, and should go among the larger pickling onions.

We have also found that the set grown from Prizetaker seed will keep as well as any other onion set known to us, and that it will make a remarkably fine and sweet early green or bunching onion. For wintering any onion sets, you must, of course, have a room where you can keep them cool and dry, either just above the freezing point, or if a little below freezing, constantly low enough that they will not thaw out until near planting time.

For green onions the sets are planted, in a mild climate during the fall, here where the winters are severe, in early spring, in rows a foot apart, in furrows an inch or two deep, and an inch or two apart in the row.

The earliest green or bunching onion is the Egyptian Winter or Perennial Tree onion (Fig 44). This is hardy as an oak, and in good soil will spread like a weed, and yield immense quantities of a fairly good green onion, especially if planted rather deep, say three inches, so that the lower end of the stalk

or bulb becomes nicely blanched. This is propagated from top sets, the latter to be planted as soon as they are mature, which is some time in August, this in a spot where they can be left for years, to yield an annually increased amount of green stalks for bunching.

Another plan of growing bunching onions has recently found consideration. This is to sow seed of the hardy Barletta, and possibly White Portugal



Fig 44—EGYPTIAN OR PERENNIAL TREE ONION

or Silverskin, in open ground during August, in same way as for ordinary onions, only using more seed, and leaving the onions out over winter, perhaps slightly protected by a thin layer of coarse litter, to make green bunching onions in early spring. I have had fairly good success in first trials.



Fig 45—ONION FIELD IN BLOOM

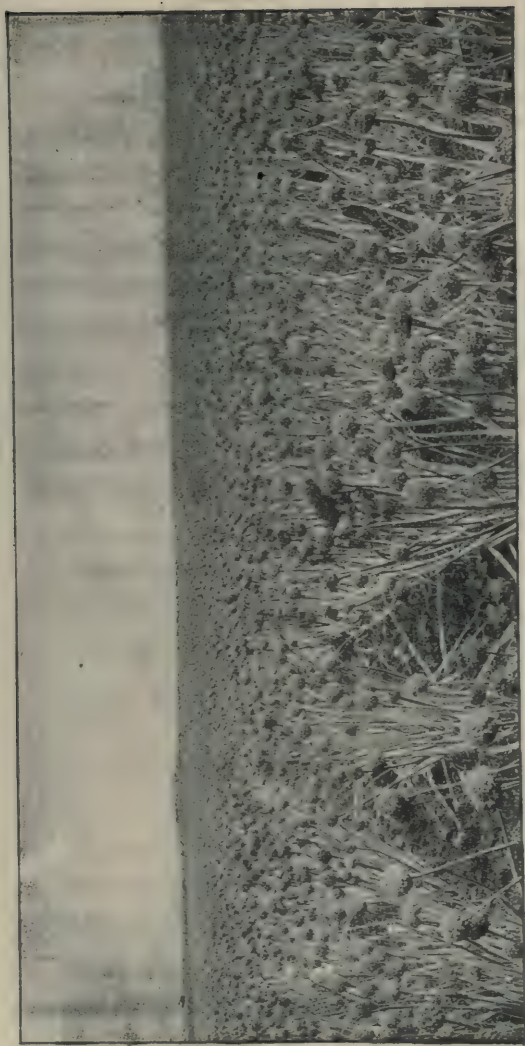


Fig 46—ONION SEED READY FOR HARVESTING

GROWING ONION SEED

One of my neighbors who grows the Prizetaker from sets for an early green onion, also grows not only his own sets, but the seed which he sows for sets. Any grower can do the same thing if he wishes. A few additional hints may not come amiss.

First grow the large onions in same way as you would grow them for market from seed sown in open ground. Select perfectly sound, well-matured bulbs of the shape and color desired in your ideal onion, and store them in a dry, cool place where safe from freezing, or at least from alternate freezing and thawing. In early spring select moderately rich soil, and apply no more than a moderate dressing of compost or chemical fertilizers. Fit this soil thoroughly for planting, by plowing and harrowing, and then set the onions in furrows, six inches deep and four to six inches apart. The furrows may be made three or three and a half feet apart. The seed is ripe when the seed pods and the upper end of the seed stalk turn yellow, and part of the pods burst open. Then cut the heads, gathering them in any convenient receptacle to carry to a dry loft where they are to be spread out thinly. When thoroughly dry, they are to be thrashed and cleaned by passing through a fanning mill. The final cleaning is given by washing. The heavy plump seeds sink to the bottom, when placed in a tub of water. The chaff and light seeds float and are gently poured off. Place in a muslin bag to drain off the water, then spread out thinly in a warm dry place to dry.

Onion seed, for commercial purposes, is now raised in California more extensively than in any other part of the world, as the climatic conditions are more favorable there than elsewhere. The long, dry summers of California insure a perfect ripening of

the crop, and there is no danger of rain spoiling the seed. The moisture necessary for the roots the grower can supply from his irrigation canals whenever required, thus practically making the climate to suit himself. Most of the work can be done outdoors which greatly facilitates the handling of the crop. There is another factor which comes to the aid of the California seed grower, and this is the availability of cheap temporary labor. When work is pressing he can hire any number of Chinamen for a day or week until his crop is in safety. Fig 45 gives an idea of the large scale at which this industry is carried on, showing a partial view of a thirty-seven-acre field of onions for seed, at Santa Clara, the plants just coming into bloom. Fig 46 presents a section of a field of Prizetaker onions ready for harvesting.

CHAPTER IX

Soils and Manures for Onions

On the subject of the preparation of the soil for onions, by previous cropping, the Farmers' Bulletin No 39 says:

"Soils which are stiff and heavy, which contain too much sand, which abound in pernicious weeds, or are deficient in fertility, may be greatly improved by the cultivation of one or more crops previous to planting onions. A favorite practice in some sections is to sow clover, and after the first crop is cut for hay, the second growth is allowed to rot on the field and with a heavy dressing of stable manure is plowed under in the fall. The following spring the ground is planted in potatoes and the next year onions are grown. Such a course of treatment leaves the soil in excellent condition. The land is improved by the application of manure and the decomposition of the clover roots and tops, while the nitrogen supply is increased both by means of the clover, which gathers this element from the atmosphere, and by the manure. The effect of such treatment is to enrich the soil, make it loose and friable, and free it from many weed seeds. Crimson clover could be used to advantage in states where this legume thrives, since, when plowed under, it produces the same effect as red clover.

"Cowpeas are used as a substitute for clover in the South. The peas may be sown in July or August, after a crop of early potatoes has been removed. The dead tops are plowed under later in the fall, with a liberal dressing of barnyard manure. If either cowpeas or clover is used, and followed the next year by

some hoed crop which does not impoverish the soil to any considerable extent, the land is put in the best condition for raising onions. Carrots are said to be the most desirable crop to precede onions. Corn and potatoes, however, are not objectionable. Of course, more plant food should be applied than these crops remove, so that the soil will be constantly improved."

All of this I heartily endorse. The subject of selection and application of manures is treated as follows:

"The onion requires a liberal amount of plant food in the most available form. The quantity and quality of manures which would make potatoes, cabbages, tomatoes, or many other garden crops profitable will not give even a fair compensation in onion culture, unless favored by soils highly fertile in their natural state. Beginners fail more frequently perhaps from lack of appreciation of this fact than from any other cause. The most expensive item in onion culture is labor. A prominent grower estimates that it costs \$100 per acre to start the seedlings, prepare the soil, transplant, cultivate, weed, and pull the crop when the new onion culture is adopted. The cost of labor is just as great for a crop of 500 bushels as for 1000. Hence it is judicious for the onion grower to be liberal in the use of fertilizers. If the supply of fertilizer is limited it will pay better to manure one acre thoroughly than two sparingly.

"Barnyard manure is indispensable in the production of superior bulbs unless the soil naturally contains a large amount of humus. Muck soils may be treated with concentrated commercial fertilizers alone, but nothing can be entirely substituted for barnyard manure on other soils with as satisfactory results. Hen manure is very highly esteemed by onion growers because of its high percentage of fertilizing

constituents. Next to this manure, that from the pigsty is considered most valuable, although rotten barnyard manure of any kind gives good results. It is customary to deposit the manure in large piles where it can undergo fermentation, or to compost it with other materials. From forty to seventy-five loads per acre should be applied if a large yield is expected. It should be spread evenly over the surface just before plowing in the fall or early spring, a manure spreader being valuable for this purpose.

"Hen manure will produce the best results when applied as a top-dressing before planting. Poultry droppings should be dried and pulverized before broadcasting. Specially prepared composts should also be spread after plowing and thoroughly mixed with the surface soil by harrowing. A common practice near large cities is to secure night soil and compost it with barnyard manure, muck or loam. This makes a valuable top-dressing. Care should be exercised that all the manures used are free from weed seeds.

"We may learn something on the question of fertilizing by studying the composition of the onion. An analysis made by the Connecticut experiment station of White Globe onions showed that 2000 pounds of mature bulbs contain 2.70 pounds of nitrogen, 0.92 pound of phosphoric acid, and 2.09 pounds of potash. The average legal weight per bushel in different parts of the Union is about fifty-six pounds. A yield of 800 bushels per acre is frequently reported. A crop of this size (44,800 pounds), therefore, would remove from an acre of soil 60.48 pounds of nitrogen, 20.61 pounds of phosphoric acid, and 46.82 pounds of potash.

"This shows that the onion removes the three essential fertilizing constituents from the soil in large quantities, and these must be supplied to the soil if it does not already contain them. Soils which have been

freely cropped with clover, cowpeas, or other leguminous plants are not likely to be deficient in nitrogen, although light dressings of the quick-acting nitrate of soda may often be profitable on such soils. Potash and phosphoric acid, however, must usually be applied more liberally. Sometimes one and sometimes the other of the three principal fertilizing constituents—nitrogen, phosphoric acid and potash—is deficient in the soil. It is important for each grower to study the special requirements of his soil. A few experiments with concentrated fertilizers will settle many doubtful points. It is impossible to supply the needed fertilizers in the proper proportions without first acquiring a fair knowledge of the fertilizing constituents already in the soil.

“Of the nitrogenous commercial fertilizers, nitrate of soda is the most largely used. It contains about fifteen per cent of nitrogen. This salt is readily soluble and exceedingly quick in its action. It should never be applied in the fall or winter, because a large amount of the nitrogen would be washed out of the soil before the growing crop required it. From 200 to 400 pounds applied in four equal dressings is sufficient in most cases. The first application should be made just before seeding or planting and mixed with the surface soil by harrowing. The other dressings may be given at intervals during the growing season, carefully broadcasting the salt. Ammonium sulphate, dried blood and wool refuse, which are also nitrogenous fertilizers, are occasionally substituted for sodium nitrate, and soot is sometimes used with advantage.

“To supply the potash, wood ashes are frequently employed. They have the additional advantage of improving the mechanical condition of the soil, making it loose and friable. Either leached or unleached ashes may be used with satisfactory results, the latter being

more valuable on account of their larger content of potash—five to ten per cent. From six to eight tons of unleached or ten to fourteen of leached ashes is a liberal supply. Ashes should be drilled or harrowed in after plowing. If ashes are not available, or if the expense of transportation is excessive, the grower will find potash salts, such as kainit and muriate of potash, valuable fertilizers. They are applied in the fall, winter or early spring. The soil will retain the potash until the plants require it, so that the loss by drainage is exceedingly small. Kainit contains thirteen to fourteen per cent of potash, and the muriate about fifty per cent. About 200 to 300 pounds per acre of the muriate, or 800 to 1000 pounds of kainit, is a sufficient application. They should be sown broadcast after plowing, and harrowed in or distributed by means of a fertilizer drill. A few hundred pounds of bone meal or other phosphates will be beneficial, if phosphoric acid is needed.

“The manures applied are never completely taken up by the growing crop. This makes it necessary to supply more than is actually needed. In the case of the potash and phosphoric acid, for which the soil has a strong retentive power, the excess will remain to benefit succeeding crops.”

In a general way I may add that the selection and application of plant foods, for the onion crop as well as for all others, is largely a matter for the exercise of uncommonly good common sense and good judgment.

CHAPTER X

Onion Varieties

With reference to the methods of propagation, onions may be divided into three classes: (1) Onions produced by division of the bulb; (2) onions produced from top sets or button onions, and (3) onions grown from black seed. The last named may be separated into two subdivisions, namely, American and foreign types.

According to Professor Bailey's *Annals of Horticulture*, about twenty kinds of multipliers, potato onions and sets were offered by American dealers in 1889.

The leading variety of the first class (onions produced by division of the bulb) is the *Potato onion* or *Multiplier*, shown in Fig 47.

This is most largely grown in southern localities. The yellow variety has been in cultivation for many years, while the white sort is of much more recent introduction. The bulbs are thick, compact, tender if eaten soon after pulling, and very mild and sweet in flavor. Fall planting is generally resorted to with this variety, the sets being placed in drills four or five inches deep. As the name "Multiplier" indicates, if a large bulb is planted, division occurs during the season of growth, resulting in the formation of from three to ten or more bulbs from the parent. If sets are planted, they will make single large onions, but not multiply. The plants begin active growth very early in the spring and may be bunched and marketed at a good profit, or may be allowed to mature. In the

milder sections of the South the Potato onion will grow during the entire winter. The mature bulbs should be stored in thin layers in a dry apartment to insure their keeping. This variety is rarely, if ever, affected by the onion maggot. From the fact that the small bulbs increase in size and the large ones multiply, it is necessary to plant both sizes in order to secure onions for market and also maintain the stock.

Shallots are frequently mistaken for the Potato onion. They differ from it in throwing up an occasional seed shoot and in the bulb always multiplying,



Fig 47—POTATO ONION OR MULTIPLIER

which is not true with small Potato onions. The bulbs are more oblong in shape than the Potato onion. Shallots are small, may be kept the year round, and possess a mild, pleasant flavor.

TOP ONIONS

To this class of onions, produced from top sets, as shown in Fig 44, properly belongs the

Egyptian (Winter Onion, Perennial, or Tree Onion)—An unusually hardy variety in the colder states, remaining in the ground with safety all winter. It starts early in the spring and may be bunched and marketed several weeks before any other variety. The quality is inferior, but the bulbs may be readily

sold when better varieties are wanting. The bulblets or top sets of this should be planted as soon as they are fully matured, which is during August. This onion also grows from division of the bulb. If planted somewhat deep in rich, loose soil, the stalk blanches in the manner of leeks as usually grown by good gardeners and makes a green onion of fairly good quality.

The common Top Set or Button onions are usually grown for green bunching by planting the bulblets in spring (at the North) in same manner as the ordinary sets that were grown from the black seed are planted.

Of the common or "seed" onions, about eighty varieties, including synonyms, are offered by American seedsmen. I give a description of the leading ones, largely quoted from Farmers' Bulletin No 39:

AMERICAN VARIETIES

Danvers (Danvers Yellow, Round Yellow Danvers, Yellow Globe Danvers)—The most largely grown of the yellow onions, being produced in immense quantities for shipping purposes. It is very productive, giving much larger yields than varieties which form flat bulbs. Four hundred to 600 bushels per acre from seed sown in the field is a very common yield, while 800 to 1000 bushels are sometimes harvested. The bulbs are very solid, large when given the proper attention, compact, and of excellent flavor. This variety commands higher prices than red onions in most markets.

Extra Early Red—On account of its earliness in maturing, this variety is valuable in many sections. The bulbs are rather small, flat in shape, and good keepers. It is especially well adapted to cold, mucky soils, and is largely used in the production of sets.

Silver Skin (White Portugal, Philadelphia White)—A variety largely used in the production of the white sets sold by seedsmen. The bulbs are handsome, medium sized, and of excellent flavor. It commands higher prices than the red or yellow sorts, but is not so productive nor so easily wintered unless thoroughly cured. The smaller bulbs are popular for pickling.



Fig 48—LARGE RED WETHERSFIELD

Wethersfield (Wethersfield Red, Large Red Wethersfield)—The most extensively grown red sort. It rivals the Yellow Danvers in many portions of the country. Some markets prefer it to that variety. The bulbs are large, growing six to eight inches in diameter in especially favorable localities. It is very productive and a good keeper. The bulbs are somewhat flattened in form; in this respect being inferior to the Yellow Danvers. The skin is deep

purplish-red, the flesh purplish-white, rather coarse and of stronger flavor than that of the yellow onions. A typical specimen, much reduced in size, is shown in Fig 48.

White Globe (Southport White Globe)—The perfect globe shape and smooth white skin make this one of the handsomest onions. It always commands good prices, but requires more care in cultivating, harvesting and storing than the red and yellow sorts. The flesh is fine in grain, pure white, and of superior flavor. The bulbs are large and yield well when given careful attention. This sort should be grown in every family garden in preference to any other large white American onion.

Yellow Strasburg (Yellow Dutch)—A productive variety, the bulbs being slightly darker in color than Yellow Danvers; of good size; quite flat, with a white and mild flesh. Yellow Danvers is preferred to the Strasburg by most growers.

Red Globe and Yellow Globe (Southport)—These varieties closely resemble the White Globe, except in color.

Australian Brown—Of medium size, good quality; early; somewhat flattened in shape, of brown color and remarkably hard and solid. It begins to form a bulb at an early period of growth, and quickly reaches maturity. For keeping qualities it is perhaps unsurpassed.

Gold Seal—An early variety, rich in color, much like the Danvers, but perhaps larger, harder and a better keeper.

Early Yellow Cracker (Extra Early Cracker, Rhode Island Yellow Cracker)—The earliest of the yellow sorts; of good quality, but should be carefully handled to insure its keeping qualities.

Giant Zittau—A very large German onion of fine quality. Surpassed here by our standard varieties, and for size by Prizetaker and many of the foreign sorts.

Prizetaker—I am tempted to include this in the list of American onions, although its origin is undisputably foreign. But seed of this famous onion has been grown in America for many years, and the onion now holds a secure place among our standard sorts. Its name is inseparably interwoven with the "new onion culture." Its introducer, Mr William Henry Maule of Philadelphia, gives me the following data about its history. He says:

"I discovered the Prizetaker in the hands of a gentleman residing in the Santa Clara valley, California, whom I happened to be visiting in the summer of 1886. I was so impressed with it that I persuaded him to plant all the bulbs he raised for seed, and agreed to take all he had. It was first offered in my 1888 catalog, and since then has been one of my leading specialties. It was some years before it became generally known, but finally, largely through the advertising which you yourself gave it, its merits became recognized, and to-day it is prominently listed in all the leading American seed catalogs."

This variety is a favorite with all growers who follow the transplanting method. It gives more general satisfaction than any other variety in the production of bulbs from seed sown under glass, the young plants being transferred to the open ground. American grown seed is greatly preferred. The Prizetaker is uniform and globular in form, and very large, some specimens weighing from four to six pounds having been grown in this country under special cultivation, while from one to three pounds are very common weights. It ripens well, and, if properly cured, may be kept through the winter,

although it is considered a poor keeper. The bulbs are bright yellow, with a thin skin. The flesh is white, fine grained, mild, with a delicate flavor. A bunch of typical Prizetakers is shown in Fig 37.

Pink Prizetaker—Similar to the Yellow Prizetaker in every respect except color, which is light red.

Prizewinner—A white Prizetaker.

FOREIGN VARIETIES

Barletta (Adriatic Barletta)—The bulbs of this variety are pure white, measuring from one inch to one and one-half inches in diameter, and about three-fourths of an inch in thickness. It is very early; the bulbs are smooth, uniform, and handsome in appearance, which makes them especially valuable for pickling. For this purpose no other variety is better adapted. The flesh possesses a mild, delicate flavor. To secure the best results the seed should be sown in loose, rich, friable soil. Seed is furnished by many seed houses also under the name "New Queen," "Early White Queen," "Pearl," etc. As I remember the New Queen from the time of its first introduction, twenty-five or more years ago, it seemed larger and somewhat later than Barletta. The probabilities are that Barletta and New Queen, in the establishments of many seed dealers, come from the same seed bag.

Bermuda (Red Mammoth Tripoli, Bermuda Red)—The bulbs of this variety are large, fine grained, and of excellent flavor. The skin is thin and rich, and of a blood-red color. The flesh is white. It is largely imported into this country.

Early Pearl (Silver White Aetna, American Pearl)—An Italian variety which matures very early. The round, flattened bulbs are pure white, and possess a mild, pleasant flavor. It is excellent for sets or

pickling, and is highly esteemed by some market gardeners.

Giant Rocca (Rocca of Naples)—This is a very large onion that is well adapted to the transplanting method of culture in the South. It requires a long season to mature the bulbs. Its flavor is mild and very pleasant. The bulbs are globular in shape, with a light, reddish-brown skin. It is very productive when transplanted or where the season is of sufficient duration.

Giant Red Rocca—This variety differs very slightly from the preceding, except that it is darker in color.

Giant White Rocca (Silver Ball)—One of the most valuable sorts of the Italian type. The bulbs are very large, white, globular, compact, and the flesh is white, with a mild, pleasant flavor. An excellent variety for either home consumption or market when the transplanting method is adopted.

Giant Yellow Rocca (Spanish King)—Resembles the Giant Red in every particular except color, which is a bright yellow. This variety may be transplanted with very satisfactory results.

Mammoth Pompeii—This is one of the largest of the foreign varieties, bulbs weighing over four pounds having been grown in this country. It does not appear to lose in quality when grown to such an enormous size. It should be grown by the transplanting method. The bulbs are red, with thin skins. The flavor, as is usual with the foreign sorts, is very mild and pleasant.

Marzajola (Italian May)—A small, early, flat onion. The bulbs are white and of superior quality.

New Queen (Pearl, Early White Queen)—This variety is quite generally known in the South as the Pearl onion, but "New Queen" is the preferable name.

It is one of the most valuable sorts for growing pickling onions from seed, although the Barletta is considered superior by many gardeners. The bulbs are pure white and can scarcely be excelled in flavor. Seeds may be sown in February where the season is sufficiently early, and mature bulbs will be produced by June. If sown in July or August another crop will be ready to harvest late in fall. The onions measure from one to two inches in diameter and generally command high prices. See also "Barletta."

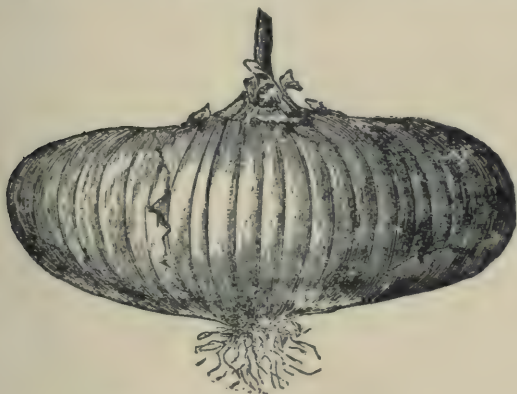


Fig 49—WHITE TRIPOLI ONION

Red Victoria—A large, handsome globular-shaped onion. Skin very dark red; flesh white or very light rose-colored; mild, pleasant. A heavy, rich loam is best adapted to this variety.

Mammoth White Garganus or Silver King (Mammoth Silver King)—A very large, white Italian variety. Bulbs are flattened; flesh white, with a mild, sweet flavor.

White Italian Tripoli (El Paso, Large Mexican)—The Texas experiment station reports that out of

fifty-eight varieties grown in 1895 from seeds sown in the open ground this variety gave the largest yield. It is very large size, flat in form, with a white skin, as shown in Fig 49.

White Victoria—The White Victoria is considered the most valuable of the White Italian onions for transplanting. The bulbs are very large, globular



Fig 50—BEAULIEU'S HARRY WHITE ONION

and handsome. Wherever tested it is most highly esteemed. It produces heavy crops when the proper treatment is given.

Giant Gibraltar—Introduced by W. Atlee Burpee & Co of Philadelphia about 1898. It is a

larger onion than even Prizetaker, and still milder in flavor. Its season of ripening is a week or two later. It has a light straw colored skin, white crisp flesh, and is perhaps the most satisfactory onion to be grown by the new transplanting method, where appearance and large yield are first considerations. It is particularly subject to fungous diseases, and not to be recommended as a keeper. Mr Burpee writes me as follows in respect to the origin of this splendid onion:

"We can give you very little information regarding the origin of the Gibraltar. All we know is that it originated in Spain. There having been on the market, when introduced, so many of the varieties of the Spanish type of onion seed, such as Yellow Spanish, White Spanish, Spanish King, etc, we decided that the name 'Gibraltar' would prevent its being confused with previously introduced or inferior varieties. We have many growers in the South that are growing the Gibraltar."

Hardy White Onion (Beaulieu's), Fig 50—I am a little in doubt about its true origin, and whether it belongs under the American or foreign onions. The introducer, Mr Henri Beaulieu of Woodhaven, Long Island, claims that it is a strain or cross of the White Portugal. From a single trial (1901-1902) it seemed to me to be of the Barletta or New Queen type. Grown from seed in open ground (sowed in August, 1901), it stood the severe winter without protection unharmed and gave an early crop of fine bunching onions. From H. W. Camden, Long Island, I have the following report: "We sow Beaulieu's Hardy White onion seed during the month of August. Plants of early sowings can be transplanted or remain in the seed bed ready for bunching to come in between winter onions (scallions) and onions from sets. If left to

ripen they will get as big around as a silver dollar. We bunch all for New York market. In 1901 we sowed two other varieties with them on same day and on same ground. All came up well. The Hardy White stood the winter well. The others died off. This year we have three other sorts side by side with the Hardy White. The seed seems to be rather delicate of germination. This is the third or fourth year we sowed this Hardy White onion. This season we have sowed twenty-five or thirty pounds. They are a good flavored, nice bunching onion."

CHAPTER XI

Insects and Diseases Affecting the Onion Crop

The Onion Maggot (*Anthomyia ceparum*)—The following is taken from the Connecticut experiment station reports:

"The adult insect, a small two-winged fly, deposits its eggs on the lower portion of the young onion plants during the months of April and May. In about a week the eggs give rise to small, whitish grubs or maggots which eat their way into the bulbs, upon which they feed for about two weeks. They then leave the bulb, enter the ground, and change to the pupa condition, from which, in course of time, the adult flies emerge. Occasionally the maggots remain in the bulb and the brown pupae are found in the stored onions. Several broods are produced during the summer. The various stages of development of the insects are shown in Fig 51.

"Various methods of destroying this pest have been recommended. Ormerod (in *A Text Book of Agricultural Entomology*) suggests rotation with some other crop in order that the flies emerging from the pupae which remain in the soil may not find onion plants at hand upon which to deposit their eggs; earthing the young plants well up above the collar so that the flies are prevented from reaching the bulb; pulling and destroying the plants first affected, by which means the migration of the maggots to sound bulbs is checked; the avoidance as far as possible of natural manures, in which the larvae of these insects live; or finally the application of lime to the land." E. O. Orpet (in *Garden and Forest*) recommends the

following method, which is well worth a trial: "Half a pint of kerosene is well mixed with a pailful of some dry material, preferably wood ashes, but sand, sawdust, or even dry soil will do fairly well; after the plants are well up and the trouble is at hand, a sprinkling of this mixture along the rows about twice a week during the time the fly does its work will be found a sure prevention of the trouble. After the end of May there is little danger, as the onions are of a good size and not so liable to injury."

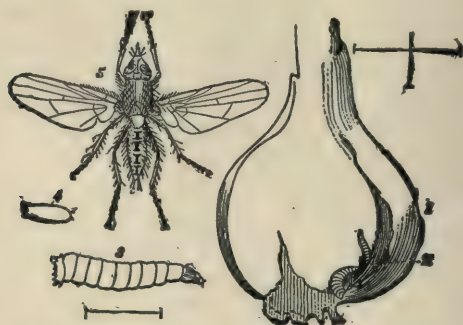


Fig 51—THE ONION MAGGOT (ENLARGED)

1, affected onion; 2, the maggot at work; 3, the full-grown larva; 4, the cocoon; 5, the adult onion fly

I invariably plant radishes, and often cauliflowers and cabbages, in immediate vicinity of the onion patch, or perhaps a few rows here and there right in it. The radishes, cauliflowers, etc, appear to act as "catch" plants. At least they are usually more or less affected by maggots, while the onions are seldom attacked. I have reason to believe that strong lime water made from freshly burnt lime will kill all the maggots with which it comes in contact. To apply it, soak the ground around the plants so thor-

oughly that the application will reach the worm feeding at the root stalk or bulb.

When the plants are in a hotbed, maggots can be destroyed by inserting bisulphid of carbon into the soil. Professor Bailey recommends to puddle the plants when transplanting in a puddle to which sulphur has been added, and sprinkle sulphur about the plants after they are set. Of course all infested plants should be pulled up and burned at once.

The Onion Thrip (Thrips tabaci)—Onion growers sometimes find their onions affected in a manner that they are undecided whether to lay the blame on insects or disease. When a plant appears as shown in Fig 52, most people will say that it has been struck by blight. The truth is, however, that the enemy is a small insect or midge. The illustration, taken from a bulletin of the Ohio station, shows a plant that is very seriously affected, and totally crippled, by thrips. The effects of the attacks appear as a white blast, and may be easily mistaken for a diseased condition. We may not have much to fear from this enemy in a wet season. It is the dry season which is liable to bring us the attacks of thrips. The Florida agricultural experiment station reports that the insect was first noticed there about the middle of April in 1897, infesting onions at the station gardens, and that the insects were destructive until about July 1, when they gradually disappeared. I quote as follows from Bulletin 46:

"In 1898, the insect was observed April 28, to be quite abundant on onions in the horticultural department, and some days later, Professor Rolfs called my attention to its occurrence on cabbage and cauliflower. To these plants it proved quite destructive during May, and the first two weeks of June. By the last of June, the insects were becoming very

scarce, and by July 15, none were to be found. Beginning with July, considerable rain had fallen, which may have hastened their disappearance.

"This species is injurious to the foliage of plants. On the onions, it chafes off the epidermis from the



Fig 52—PLANT ATTACKED BY THRIPS

green leaves, thereby causing them to dry out, whiten and frequently die. On the cabbage and cauliflower their effects are about the same. They are much more abundant on the lower surface of the leaves, where they chafe off the leaf substance, much as in their attack on onions.

"According to Mr Th. Pergande, assistant entomologist, United States department of agriculture, the

onion thrip occurs in the following localities: Russia, Germany, Bermuda, Connecticut, New York, New Jersey, Pennsylvania, Virginia, Ohio, Illinois, Colorado and California. To these should now be added Florida. It is doubtless of European origin, and has been brought over in some shipment of onions or cabbage. The insect was first made known to science by Dr Londeman of Moscow, who found it very destructive to tobacco in southern Russia.

"The egg of this species is almost colorless, elongate, and curved. The egg state lasts from three and a half to four days. Upon hatching, the larvae are quite agile, running about readily if disturbed. They are almost transparent in color but become gradually of a greenish-yellow color, the greenish tint due doubtless to the contained food. These larvae are somewhat gregarious in their habits, and may be seen feeding together in groups. They use the spines on the end of the abdomen to drive away intruders, by striking right and left. In almost all cases it has the desired effect, and the victim seems glad to get away. The larval stage lasts from seven to nine days. The nymph stage lasts for four days, the insect remaining almost in the same tracks throughout the period, if left undisturbed. No food is taken.

"The third and last molt of the insect is from the nymph to the adult condition. A newly developed adult is quite light in color, and does not acquire the normal color for twelve to fifteen hours. The length of life of an adult was not satisfactorily determined. Specimens were kept, however, for nearly three days, when they met with an accident. From the above it will be seen that the total life cycle of the insect in Florida is approximately sixteen days. . . . In Florida there are probably no distinct broods, as all stages may be found at the same time. Allowing for

the life cycle at sixteen days, a large number of broods could occur during the year, but unfavorable conditions keep them reduced except during the spring and perhaps early summer, so that it will probably not happen that they will develop throughout a year, according to their capabilities.

"Several insecticides were tried against this insect. They may be successfully controlled by the use of whale oil soap (Anchor brand), at the rate of one pound of soap to four gallons of water; or by the use of rose leaf insecticide, at the rate of one pint to four gallons of water. The use of kerosene emulsion will also be found effective.

"In spraying against the insect, it should be done thoroughly; the soil around the plant should also be sprayed as well as the stems of cabbages and cauliflowers, thus destroying the pupae that may be in hiding."

Onion Cutworms—The onion growers of some parts of New York state and other onion growing districts throughout the northern half of the United States, have occasionally suffered severe losses by the depredations of one of the cutworms, the dark-sided cutworm (*Carneades messoria*), known also under the names onion cutworm, climbing rustic and reaping rustic. This climbing cutworm does not confine its work to the onion field, but also attacks other garden plants, as well as flower buds upon trees and shrubs. The worm itself, while young and small, climbs up on the plants in search for the tenderest parts, and in that stage only takes the tips of the onions. When older, the worms become too clumsy to climb and content themselves with eating off the plants at the surface of the ground. They usually feed at night, but may, when food is scarce, march from plant to plant by day, as does the army worm, traveling slowly

and leaving behind them only the stubs and roots. None of my onion patches have ever suffered from the depredations of cutworms. In fact, clean culture and an intensive system of gardening which calls for continued cropping, following one crop closely with another to the very end of the season, have banished cutworms, grubs and wireworms almost entirely from my fields.

To Bulletin No 120 of the New York state experiment station, Geneva, I am indebted for the following life history of the onion cutworm: "It is probable that, on the onion fields at least, the eggs are mostly laid in the late fall upon the weeds and other debris remaining upon uncultivated spots in the fields, along ditch borders and fences, or on adjoining highlands. From these highlands the weeds and eggs are borne upon the fields by the high waters of early spring and furnish starting points for the spread of the young worms. These also advance from the borders of the field and from the ditch banks. Some of the eggs may hatch in the fall, and the young worms feed for a time before going into winter quarters in the ground, and some of the moths probably remain alive though dormant during the winter and resume egg laying in the spring. The small size of the worms, however, when they are first seen feeding in the spring, and their occurrence in such numbers on the gray soils which receive so much of the wash of the uplands and in scattered spots in the fields where the water-borne debris is found, would seem to indicate that they reach these places in the egg form upon the weeds, hatch early in the spring, and spread soon to the onions. They begin to feed early in May, and when first noticed (May 12) they were from one-tenth to one-half grown, and were from one-eighth to one-fourth of an inch in length. They

eat ravenously and continue to grow until they finish feeding, sometime before the middle of June. They are then about an inch and a quarter in length, and are marked upon the sides by a decided dark band or stripe. They now burrow into the ground a short distance and form small cavities in which they change, first to dark brown chrysalids, and then into moths. The moths may emerge at any time between the last of July and October, and they soon begin to lay their eggs."

The following treatment is recommended for severe visitations of this enemy. Mix thirty pounds of dry bran and middlings in equal parts, with one pound of Paris green. "This mixture can be distributed by means of an onion seed drill, and thus deposited evenly and continuously about the margins of the fields before the advancing destroyers. It forms a line of defense across which the worms will seldom pass without feasting to their death. If the worms become scattered over the fields, the dry bait can be applied quickly and uniformly alongside the rows by use of the drill.

"This treatment is fully as efficient as hand picking, is less expensive, and is, for onions, at least, a very satisfactory defense against the cutworms. It can also be used successfully and with ease to protect cabbages, tomatoes, egg plants, sweet potatoes, strawberries and similar garden plants, by surrounding each, at time of transplanting, with a little of the poisoned mixture.

"If the onion grower will have ready for the cutworms when they first appear upon the grass about his fields a meal of the tempting but deadly, poisoned dry bait, and will offer this food to them whenever and wherever they appear among the onions, his loss from their ravages will be but small."

White grubs (larvae of the May beetle) and wireworms (larvae of snapping bugs) are sometimes found feeding at the onion roots. It may be possible to drive away the grubs by applications of caustic liquids, such as lime water, saturated solutions of kainit, or of muriate of potash; although I am not sure on this point. The wireworm is too tough, however, to be affected by such means. The best way of fighting these troublesome customers is to plow and thoroughly pulverize our fields in autumn, or any time after latter part of July.

The Smut of Onions (Urocystis Apulae Frost)—A very serious disease of the onion plant, but from which the onions grown on the new plan of growing and transplanting seedlings have little to fear, is the rust, smut or blight. This disease has recently played havoc in several of our great onion districts, especially where onions have been grown in succession for a number of years. The spores seem to remain in the soil, reappearing after a long series of years when onions are again grown. Smut attacks the onion at the time the seed germinates and *then only*. Its appearance shows itself in black streaks on the stems; afterward the stem bursts, and the black powder is seen more plainly. The onion never develops, but rots. Pull up and destroy the diseased plants, and another year plant on new soil. That is about all that I could suggest as a preventive or remedy for smut.

The following excerpt is from the annual report of the Connecticut agricultural experiment station:

General Characters—The presence of smut in onions is first indicated by one or several dark spots at different heights in the leaves of seedlings, which are seen to be more or less opaque when the plant is held up to the light. These dark appearances may be seen in the first leaf, before the second leaf has begun to

develop at all, and are more commonly found just below the "knee"; though they sometimes occur above it. After a time, usually while the second leaf is developing, longitudinal cracks begin to appear on one side of these spots, which widen and show within a dry, fibrous mass, covered with a black, sooty powder made up wholly of the ripened fruit or spores of the fungus, which are blown or washed out onto the ground. In some cases the smut may appear only toward the upper end of the first leaf, and become cut off from the main body of the plant by the withering of the former. In such a case an onion which has shown smut in its first leaf appears, in some instances, to recover, showing no signs of smut in its subsequent growth; but as a rule the same dark appearance shows itself in the second leaf and those subsequently formed, and if the seedling is pulled up and examined, the whole plant will be found to be pervaded by the disease to a greater or less extent. Plants thus diseased, especially if the soil is dry, very commonly succumb early, drying while in the second or third leaf. The stronger plants, however, especially if the ground is moist, are able to resist the smut sufficiently to make a considerable growth, and many survive even up to the time of harvesting.

Distribution and Severity—The onion smut occurs in Massachusetts, Ohio and Pennsylvania, if not in several other states; Connecticut appears to suffer more from this disease than any other locality.

The severity of the disease in different localities is variable. It appears at first in isolated spots here and there in a field, and from these spreads in all directions until the whole piece becomes affected, and the cultivation of onions upon it has to be discontinued. This period from the first appearance of the smut to the enforced discontinuance of the onion crop,

appears to be, on new ground, never less than five years.

It appears to be during the germination and earliest growth of the onion seed only that the fungus threads, developed from the spores, make their entrance into the onion seedling. Onions grown in warm, light soils are usually more likely to be smutted than if they are grown in heavy, wet land. . . . It seems undoubtedly true that the yellow and especially the red varieties are less susceptible than the white to this, as to most other diseases affecting the crop.

Dissemination—The popular impression that smut is disseminated principally in the planted seed is one which is quite erroneous. As a matter of fact seed onions are not attacked by smut, and the presence of smut spores *in* the seed is not to be considered for a moment as a cause of its dissemination. It is very probable, however, that smut may in some instances be carried *on* seeds grown in smutted districts, the spores adhering to their surface as any small particles of dust might do. Any course of procedure in harvesting or in preparing seed which involved the dusting of even a small amount of smutted earth upon it, would render the seed dangerous for this reason. Proper care in gathering and handling seed should, however, obviate this danger entirely.

The local dissemination of smut is due to four principal causes. First, through agricultural implements, plows, harrows, weeders, rakes, etc, which spread the soil containing smut spores, both by scattering the surface earth over a smutted field and, unless they are thoroughly cleaned, by carrying earth containing smut spores into fields subsequently worked upon. Secondly, through the adherence of the same smutted earth to the feet of men and farm animals

and its consequent transportation from one part of a field to another or to different fields; an agency by no means unimportant. Thirdly, the smut spores may be readily washed with surface earth from higher to lower ground, as is a matter of common observation. Fourthly, popular opinion to the contrary, the spores being practically imponderable may be readily blown, with other dust-like material, either about the same field, or into adjoining fields. The reason that this mode of dissemination is of less importance than some others, lies probably in the fact that the spores being formed and making their exit from the onion comparatively near to the ground, are readily washed into it by rain, and have little opportunity for blowing directly into the air, as is the case with corn smut, for example.

It may be mentioned here that the smut appears to be very attractive to the "flea beetles," which swarm over the ruptured parts of diseased seedlings and apparently feed upon the spores, although they do not seem to trouble the healthy onion leaf. That these or other insects may serve to spread the smut, in a way similar to that observed in some other fungi, is not impossible.

General Precautions—Attention should perhaps be called here to a few general precautions which may be of service against the *Urocystis*, the most important of which have already been referred to in connection with its dissemination by farm implements, etc. Such implements should never be used on smutted ground and then upon new ground, without thoroughly washing off all adhering earth. The same may be said in regard to any means by which smutted earth may be transported.

All refuse of whatever kind that is left on the field should be *burned* as soon as practicable, and

although onion land is usually kept so clean that it cannot be burned over in the fall, this practice will be found very advantageous when it is possible.

At the second and subsequent hand weedings all onions which show smut in the second or third leaf should be pulled, collected in a basket or other convenient receptacle and burned at once. This practice involves very little trouble, and the folly of leaving the larger smutted onions to discharge crop after crop of spores upon the ground, as the leaves successively mature, is apparent; especially when the enormous number of spores thus formed is considered. It is hardly an overestimate to say that a single large onion may mature during a season something like a cubic inch of smut, which means between one and two thousand millions of spores, each capable of producing a smutty onion in the following season.

If an onion grower has unlimited land suitable for the crop it is almost superfluous to say that the best means of avoiding smut is to take up new land as soon as the old shows signs of the disease to any considerable extent; but, as has been previously remarked, this is not a *remedy* for smut, any more than it would be a remedy to stop raising onions altogether in affected sections.

Transplanting, as a Preventive of Smut upon Onions—Two methods of raising onions have long been practiced by Connecticut growers; one directly from seed, the other from small onions of the previous year's growth, called "sets." . . . It has been observed that onions raised from sets remain free from the disease even upon fields where onions raised from seed always suffer more or less seriously. Thaxter first . . . demonstrated that the smut fungus enters the onion seedling only while the latter is beneath the surface of the ground. . . . The fact

of the immunity of transplanted seedlings was mentioned by Thaxter in this connection.

The method of growing onions by starting the seed in hotbeds, and transplanting the seedlings to the field, was suggested in 1891 by Mr T. Greiner of La Salle, New York, and has since been practiced by him and by others with marked success. Several of the experiment stations also have tried this method. But all of these experiments have had for their object increase in the size and value of the onion crop. As far as that was concerned they were successful in proving that larger yields are obtained at no greater expense, and that the onions are larger and mature earlier than onions grown from seed sown in the open. But it seemed more than likely that this method would have another important advantage in producing a sound crop of onions even upon smutty land.

It seems fair to conclude that by raising seedlings in flats, and transplanting to the open ground, a clean crop of onions can be grown even upon land thoroughly infested with smut.

The Onion Mildew (*Peronospora Schleideni* Ung)—This fungus, which is similar in nature to the downy mildew of the grape (*Peronospora viticola*), is well known in Europe as producing a serious disease of cultivated onions, occurring also on wild species. In this country it has been known to produce injury among onions in Wisconsin, specimens having been collected at Ithaca in that state. In Wethersfield, Connecticut, it was observed only upon seed onions. . . . In regard to remedies against this mildew, preventive rather than curative measures seem to offer the best prospects of good results. Knowing that it is perpetuated over winter and originates during the following season by means of resting spores, which

survive in the dead tissues of the onion leaves and stalks, the necessity for destroying all such refuse needs hardly to be pointed out. The common practice of plowing in stalk and field refuse generally cannot be too strongly condemned, and in the present instance renders the infection of onions grown on the same land another year almost certain. The stalks should invariably be burned in a manner to render their destruction as complete as possible. The repeated use, for the same crop, of land on which the disease has appeared, should be avoided; and in localities where the disease is known to exist, the use of low sheltered land should be avoided for this crop.

The Onion Macrosporium (*Macrosporium sarcinula* Berk; variety *parasiticum* Thum)—In a majority of cases, the mildew just described was followed by a black appearance, resulting from the growth of a fungus wholly different from the *Peronospora*, namely, the onion *Macrosporium* (*M. sarcinula* var *parasiticum*). Although more common and conspicuous among seed onions which have suffered from the mildew, this fungus appears to be almost universal among onions in the state, occurring on market as well as seed onions and sets. It is much more conspicuous on the seed stalks than elsewhere, forming a deep black, velvety coating, which sometimes involves the whole stalk. On the leaves it is less conspicuous, often brownish or not so evenly black, and when the mildew has not preceded it, it is less evenly diffused, occurring here and there in patches.

In regard to remedies in the case of this disease, it is not probable that any direct treatment would be advisable; but it should be kept in check by the systematic destruction of all stalks and field refuse generally, which can only be done effectually by burning.

Plowing in such refuse, or composting it, should never be resorted to under any circumstances.

The Onion Vermicularia (*Vermicularia circinans* Berk.)—The outer bulb scales of the white varieties of onions, before they are harvested, are often attacked by a black growth, quite inconspicuous at this time, and composed usually of a central black dot, or small ring, outside of which one or more larger rings are arranged concentrically and with greater or less regularity. When kept in a moderately moist, warm atmosphere, this black appearance extends itself with considerable rapidity, either growing in concentric circles or successive wavy lines, or forming evenly black areas on the bulb. At first this is confined to the outer layer of scales; but, as the disease extends, it penetrates several successive layers, inducing decay and often presenting an appearance, beneath the outer layer, hardly distinguishable, at first sight, from the onion smut. If the black rings and blotches are examined closely they may be readily seen to be composed of numerous black points of various size, single or running together in clumps, and apparently made up for the most part of very minute bristles.

The economic importance of this disease rests upon the fact that, although it does not as a rule injure the onions seriously, or become conspicuous upon them until after they are housed, it often attacks them subsequently to such an extent as greatly to disfigure them, and impair their value for marketing purposes. Some idea of the serious nature of the disease may be inferred from the fact that one gentleman, whose statement is wholly reliable, estimates his actual loss from this cause during the past season at several thousand dollars.

The fungus is introduced into the onion house from the field, where it occurs not very abundantly

on the bulbs before they are pulled, especially if they have been weakened from any cause, and among the housed onions it propagates itself with a severity proportional to the favorableness of the conditions offered it for the formation, dissemination and germination of its spores above described. These conditions are warmth and moisture, and the proximity of uninfected bulbs. It may be communicated by contact with diseased bulbs or with any object, such as the hands, or tools that have been subjected to such contact, and may be also spread by strong drafts which blow about the spores or dry scales containing them.

The most important precaution which can be taken against the disease consists in housing the onions during dry weather after the bulbs are thoroughly dried off. No bins which have contained such black onions should be used a second time, until they have been thoroughly cleaned and sprinkled with quicklime, or quicklime and sulphur. All danger of heating should be avoided, and the onions stored in as cool and dry a place as possible, which can be arranged to be ventilated in dry weather and shut up when the atmosphere is moist. Should the fungus be noticed on the bulbs at the time of storing, or in any case when there has been previous damage from this cause, it is probable that a treatment with dry air-slaked lime, such as has been recommended with success for potatoes (one bushel of lime to twenty-five bushels of onions), applied *at the time of storing*, would prove of great service in checking the spread of the fungus. The utility of this practice, however, needs confirmation by actual experiment before it can be definitely recommended. In any case, such treatment should be made at the outset, since it would have

comparatively little influence after the disease was well established.

The question has been asked whether bulbs attacked by the *Vermicularia* can safely be used for seed onions, and it may be said that this can be done with perfect safety, provided that the fungus has not attacked them sufficiently to have induced rotting; since as a rule the surface layers only are affected, the bulb being otherwise sound. No infection of the seed or seed stalks is to be feared; but the old bulb will be likely to harbor the fungus during the summer, and communicate it to market onions if planted near them.

CHAPTER XII

Growing Onions in the Southern States

REPORT FROM PROF W. F. MASSEY OF NORTH CAROLINA

It was long the general opinion, and is still the opinion of some, that in the South the onion crop must always be treated as a biennial and grown from sets. It was thought that the crop could not be produced in the warmer climate of the southern states the same year from spring sown seeds.

The reason for these erroneous notions was that the southern gardener copied too closely the methods laid down in books written for the North. Thus, sowing the seed at the time which is proper for the northern states resulted in sets rather than onions, because the hot weather comes too soon for them and causes them to stop growing. But when we took into consideration the hardiness of the plant and the difference in climate, and sowed the seed in February instead of April, we had as long and cool season for them as in the North, and the result was fully as good a crop of ripe onions as can be grown anywhere.

But the development of market gardening in the South of late years has brought a demand for an early onion which can be bunched when half grown and put on the market green. For this purpose, the sets are essential. We grow the sets by sowing seed very thickly in soil of only moderate fertility early in April. We use the Queen onion for this purpose, as it is a very early sort and is also quite hardy in the winter. The sets are taken up as soon as the tops ripen and

spread in a dry place with the tops on, as they keep better in this way. In September the tops are cleaned off and the sets prepared for planting. This can be done at any time in the fall up to November, but the earlier the better.

We mark off the land in rows twenty inches apart or even less, for all the cultivation needed can easily be done with a wheel hoe run by man power. Light mellow soil is needed, and it should be high and well drained. In the furrows we place about 1000 pounds per acre of a mixture of 900 pounds of acid phosphate, 600 pounds of cottonseed meal, and 400 pounds of muriate of potash to make a top. This has a furrow thrown over it from each side, making a sharp list. The lists are flattened somewhat and in shallow furrows made on them the sets are planted deeply so that they will be about on the level soil when the earth is drawn from them in February, but we set them deep as a winter protection. These sets are for the early green onion only. For a ripe crop we prepare the land thoroughly and sow the seed in the spring about the middle of February and thin them when up to about three inches in the row. We use the same fertilization as for the fall sets. For this crop we have found nothing better than the Southport White Globe, as it keeps better than any onion we have grown, and we have tested eighteen or twenty other varieties.

The yellow Potato onion is about the earliest ripe onion that can be put on the market, and it generally pays very well, because the market is at that time pretty bare of ripe onions. But the Potato onion must be sold as soon as ripe, for it is a poor keeper. It makes no seed, but produces offsets from the bulbs, which are set in the fall as other sets, a small set making a big onion and a larger one two to three of

marketable size. There is another onion of the same character but white in color, which is used at times for early green onions. This one never grows as large as the yellow Potato onion, but is one of the best keepers, and its white color makes it desirable for the bunching in spring.

Of late years there has been a great deal of talk in regard to a new method of growing onions. This is to sow the seed under glass in winter or early spring, and transplant them later. This method is of no advantage in the culture of the ordinary American varieties, but works very well with the big yellow onion sold under the name of Prizetaker. In the South the seed of this onion should be sown in a cold frame protected by glass sashes about the middle of January. Care must be taken to give plenty of air in the frame and to keep the plants from drawing up too tender. Gradually expose them to the air, so that by the last of February or early March they will be ready to set in the open ground. Set them just as advised for the sets, and when well established draw the earth from them so as to have the onions resting on the surface and only the roots in the ground. This onion makes the big yellow onion seen at times in boxes in the grocery stores, and is the largest onion grown and one of the mildest.

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IN CONCLUSION

I do not despise "the good old way." There is and will continue to be money "in onions," even when grown as heretofore, provided the grower understands his business, and it does not happen to be a year of excessive production. With fairly good soil, heavy manuring and skillful management it is not a difficult task to grow 600 bushels, and even upward, to the acre. Such crop should leave the grower a good profit, even at fifty cents a bushel.

But we have learned to do better—much better—than this, by practising the "new onion culture." This is worth the trial for any onion grower situated as we are. The average price is much lower than formerly, while our lands have decreased in fertility. If there is a way to increase the yield, and the price at the same time, we cannot afford to ignore it.

The good old way
Of yesterday,
May not be best
For us to-day.



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